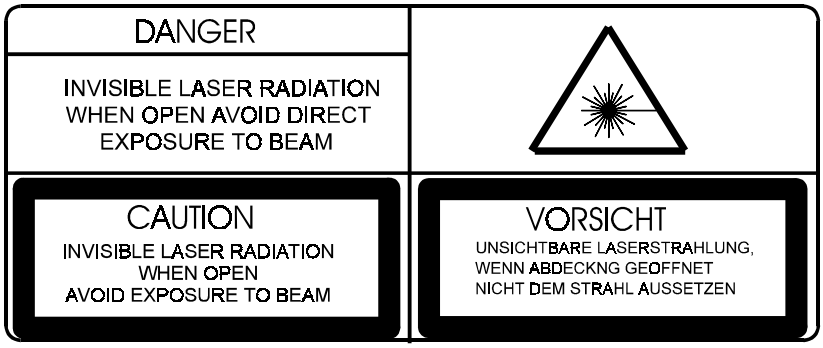
SCHMIDT 3

RICOH FAX2900L

SERVICE MANUAL

21 May, 1999
Subject to change

Important Safety Notices



H547R500.WMF

Laser Safety

⚠**WARNING FOR LASER UNIT**
This machine contains a laser beam generator. Laser beams can cause permanent eye damage. Do not open the laser unit or look along the laser beam path while the main power is on.

Lithium Batteries (Memory Back-up)

⚠**CAUTION**
The danger of explosion exists if a battery of this type is incorrectly replaced. **Replace only with the same or an equivalent type recommended by the manufacturer. Discard used batteries in accordance with the manufacturer's instructions.**

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1. OVERALL MACHINE INFORMATION

1.1 SPECIFICATIONS

Type
Desktop transceiver

Circuit
PSTN, PABX

Connection
Direct couple

Document Size
Length:
105 - 364 mm [4.1 - 14.3 ins]
Up to 1.2 m [47.2 ins], manually assisted
Width:
148 - 218 mm [5.8 - 8.5 ins]
Thickness:
0.05 to 0.2 mm [2 to 8 mils]
(equivalent to 50 - 90 g/m^2)

Document Feed
Automatic feed, face down

ADF Capacity
30 sheets (using Letter size 20 lb paper or A4 size 80 g/m^2)
15 sheets (using LG size 20 lb. paper)

Scanning Method
Contact image sensor, with LED lamp

Maximum Scan Width
216 mm [8.5 ins] ± 0.25%
(Effective scan width: 210 mm)

Scan Resolutions
Main scan: 8 dots/mm [203 dpi]
Sub scan:
Standard - 3.85 lines/mm [98 dpi]
Detail - 7.7 lines/mm [196 dpi]
Fine - 15.4 lines/mm [392 dpi]

Memory Capacity
ECM: 128 Kbytes
SAF:
Standard: 960 KB (76 pages/ITU-T #1)
With 1 MB option: (156 pages)
With 2 MB option: (236 pages)
With 4 MB option (396 pages)

Compression
MH, MR, MMR, JBIG (only for the USA model)

Protocol
Group 3 with ECM
Group 4 (ISDN G4 option required)

Modulation
V.34, V.33 (Ricoh mode only),
V.17 (TCM), V.29 (QAM), V.27ter (PHM), V.21 (FM)

Data Rate (BPS)
G3:
33,600/31,200/28,800/26,400/24,000/21,600/19,200/16,800/14,400/12,000/9600/7200/4800/2400
G4 (option):
64 kbps/56 kbps

I/O Rate
With ECM: 0 ms/line
Without ECM: 2.5, 5, 10, 20, or 40 ms/line

Transmission Time
G3: 3 seconds at 28,800 bps;
Measured with G3 ECM using memory for an ITU-T #1 test document (Slerexe letter) at standard resolution
G4 (option): 3 seconds at 64 kbps
Measured with an ITU-T #1 test document (Slerexe letter) at detail resolution

Printing System
Laser printing, plain paper, dry toner

Printing Time
10 ppm for letter, or A4 size paper

Paper Size and Capacity
Standard Cassette: 250 sheets
Letter, Legal, A4, A5 sideways, F4

Multi-purpose Feeder (Optional):
100 sheets: Letter, Legal, A4,
A5 sideways, F4
Paper Feed Unit (Optional):
500 sheets: Letter, Legal, A4,
A5 sideways, F4

Paper Weight:
16 lb (60 g/m$^{2)}$ to 24 lb (90 g/m^2)

Maximum Printing Width
212 mm [8.3 ins] (Letter)
206 mm [8.1 ins] (A4)

Print Resolutions
Fax and Copy Mode:
Main scan: 16 dots/mm [406 dpi]
Sub scan: 15.4 lines/mm [392 lpi]

PC Fax (Optional)
Application Programming Interface
TR29, EIA592: Class - 2
Transmission Speed
14,400/12,000/9,600/7,200/4,800/2,400 bps
(depending on software applications)

Power Supply
USA: 115 ± 20 Vac, 60 ± 3 Hz
Europe/Asia: 220 - 240 ±15% Vac,
50/60 ± 3 Hz

Power Consumption (Base Machine Only)
Standby: Minimum 2 W; Normal 30 W
Transmit: 50 W
Receive: 250 W
Copying: 300 W

Operating Environment
Temperature: 15 - 25 °C [59 - 77 °F]
Humidity: 30 - 70 %Rh

Dimensions (W x D x H)
410 x 730 x 323 mm
[16.1 x 28.7 x 12.7 ins]
Including trays (Maximum dimensions)

Weight
Approx. 13 kg [28.7 lbs.]
Including cartridge and trays.

NOTE: 1) ISDN G4 unit is a standard component for the I-Schmidt 3.
However, the NCU is not installed in the I-Schmidt 3.
2) JBIG compression is available only in the USA model.
3) The PC Fax Expander option is available only in Europe and Asia.

1.2 FEATURES

KEY: O = Used, X = Not Used,
A = With optional memory only,
B = With optional multi-purpose feeder only
C = With optional handset only
D = With optional counter only
E = With optional paper feed unit only
F = With optional G4 unit only
G= With optional PCFE only

Equipment	
ADF	O
Book scan	X
Bypass feed: 1 sheet	X
Optional cassette (100 sheets)	B
Optional cassette: Universal	O
Optional paper feed unit	E
Cabinet	X
Mechanical counter	D
Cutter	X
Handset	C
Hard disk	X
Manual feed mechanism	X
Marker (Stamp)	O
Monitor speaker	O
Optional memory	O
Optional printer interface	X

Video Processing Features	
Automatic image density	O
Contrast	X
Halftone (Basic & Error diffusion)	O
MTF	O
Reduction before TX	X
Scanning resolution	O
Smoothing to 16 x 15.4 l/mm	O

Communication Features - Auto	
AI short protocol	O
Automatic fallback	O
Automatic redialing	O
Confidential reception	O

Communication Features - Auto	
JBIG compression (USA model only)	O
Dual access	O
Resolutions available for reception Fine Super fine	 X X
Substitute reception	O
V.34 communication	O

Communication Features - User Selectable	
Action as a transfer broadcaster	X
AI Redial (last ten numbers)	O
Answering machine interface	O
Authorized Reception	O
Auto dialing (pulse or DTMF)	O
Auto document	O
Automatic voice message	X
Batch transmission (max 50 files)	O
Broadcasting	O
Chain dialing	O
Communication result display	X
Confidential ID override	O
Confidential transmission	O
Direct fax number entry	O
Economy transmission	X
Fax on demand	X
Forwarding	O
Groups (7 groups)	O
Hold	X
ID transmission	O
Immediate redialing	O
Immediate transmission	O
ISDN	F
Keystroke programs	O
Memory transmission	O
Multi-step transfer	X
OMR	X
On hook dial	O
Ordering toner	X

Communication Features - User Selectable	
Page count	O
Page separation mark	O
Parallel memory transmission	O
Personal codes	O
Personal codes with conf. ID	O
Partial image area scanning	X
Polling reception	O
Polling transmission	O
Polling tx file lifetime in the SAF	X
PWD (tx only)	O
Quick dial (30 stations)	O
Reception modes (Fax, Tel, Auto)	O
Remote control features	X
Remote transfer	X
Restricted access	O
Secured polling reception	O
Secured polling reception with Stored ID override	O
Send later	O
SEP (tx only)	O
SID (tx only)	O
Silent ringing detection	X
Specified Image area	X
Speed dial (100 stations)	O
SUB	O
Telephone directory	O
Tonal signal transmission	O
Transfer request	O
Transmission deadline (TRD)	O
Turnaround polling	X
Two-step transfer	X
Two in one	O
Voice request (immediate TX only)	X

Communication Features - Service Selectable	
AI short protocol	O
Auto-reduction override option	O
Busy tone detection	O

Communication Features - Service Selectable	
Cable equalizer	O
Closed network (TX and RX)	O
Continuous polling reception	O
Dedicated TX parameters	O
ECM	O
EFC	X
Inch-mm conversion	O
JBIG compression (USA model only)	O
Page retransmission times	O
Protection against bad connections	O
Short preamble	X

Other User Features	
Automatic service call	Service
Center mark	O
Checkered mark	O
Clearing a memory file	O
Clearing a polling file	O
Clock	O
Confidential ID	O
Copy mode	O
Copy mode restriction	X
Counters	O
Daylight saving time	O
Destination check	X
Direct entry of names	O
Energy saver (Night timer and standby mode)	O
File retention time	X
File retransmission	X
Function programs	O
ID code	O
Label insertion ("From xxx")	O
Language selection	O
LCD back light	O
LCD contrast control	X
Memory lock	O
Modifying a memory file	X
Multi-sort document reception	X
Multi-copy mode (up to 99)	O
Own telephone number	O

Other User Features	
PC scanner	G
PC fax	G
PC print	G
Print density control	X
Printing a memory file	O
Printing a quick dial sheet	O
Quick dial label printing	O
RDS on/off	O
Reception mode switching timer	X
Reception time printing	O
Remaining memory indicator	O
Remote ID	X
Reverse order printing	O
RTI, TTI, CSI	O
Service report transmission	X
Speaker volume control	O
Specified cassette selection	E
Substitute reception on/off	O
Telephone line type	O
Toner saving mode	X
User function keys (2 keys)	O
User parameters	O
Wild cards	O

Reports - Automatic	
Charge control report	X
Communication failure report	O
Communication result report	O
Confidential file report	O
Error report	O
File clear report	X
File reserve report	X
Journal	O
Power failure report	O
Toner cassette order form	X
Transfer result report	O
Transmission result report	O

Reports - User-initiated	
Charge control report	X
File list	O
Group list	O
Help list	O

Reports - User-initiated	
Journal	O
Personal code list	O
Program list	O
Programmed special numbers list	O
Quick dial / User function list	O
Speed dial list	O
Transmission status report	X
User parameter list	O

Service Mode Features	
Back-to-back test	O
Bit switch programming	O
Book mode test	X
Cable equalizer	O
Comm. Parameter display	O
Counter check	O
Country code	O
DTMF tone test	O
Echo countermeasure	O
Effective term of service calls	O
Error code display	O
Excessive jam alarm	O
File transfer (all files)	O
LCD contrast adjustment	X
Line error mark	O
Memory file printout (all files)	O
Modem software download	X
Modem test	O
NCU parameters	O
Operation panel test	O
Periodic service call	O
PM call	O
Printer mechanism test	O
Printer test patterns	O
Programmable attenuation	X
Protocol dump list	O
RAM display/rewrite	O
RAM dump	O
RAM test	O
RDS	O
Ringer test	X
Scanner lamp test	O
Scanner mechanism test	O
Sensor initialization	X

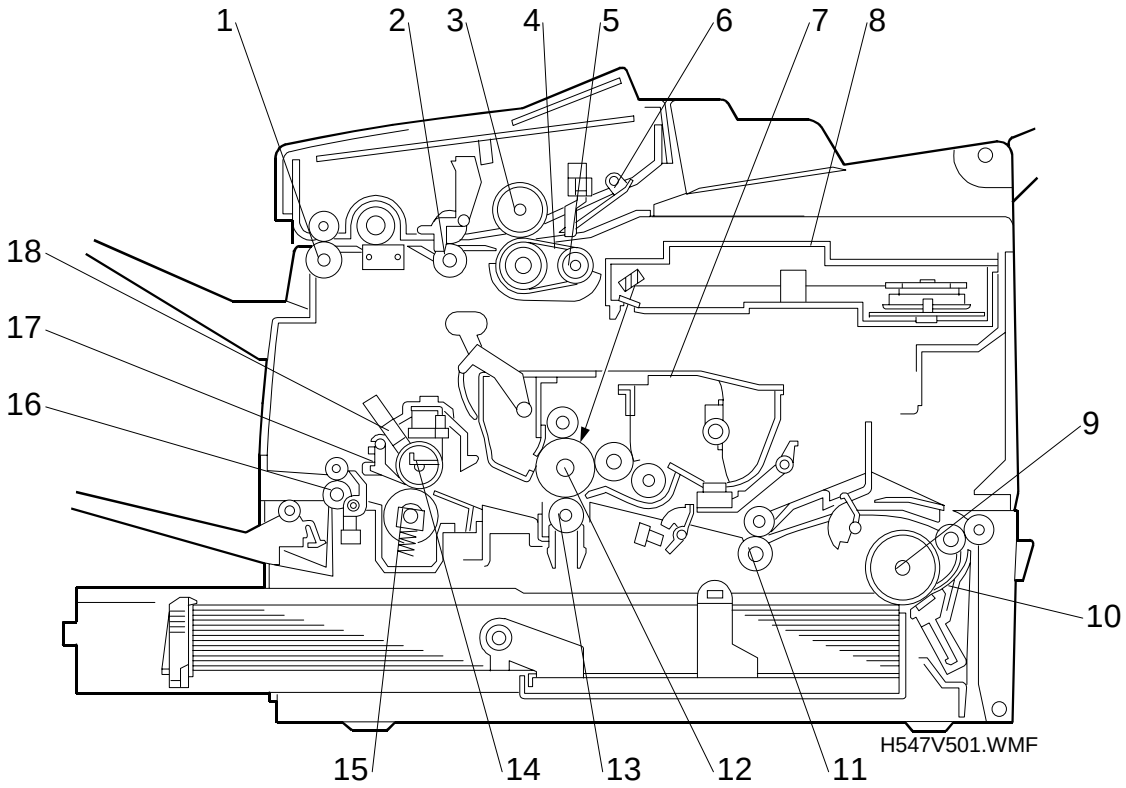
Service Mode Features	
Serial number	O
Service monitor report	O
Service station number	O
Software upload/download	O
SRAM data download	O
System parameter list	O
Technical data on the Journal	O
Thermal head parameters	X

Memory Files

Maximum number of files: 100
Maximum number of stations/file: 140
Maximum number of stations: 300

1.3 COMPONENT LAYOUT

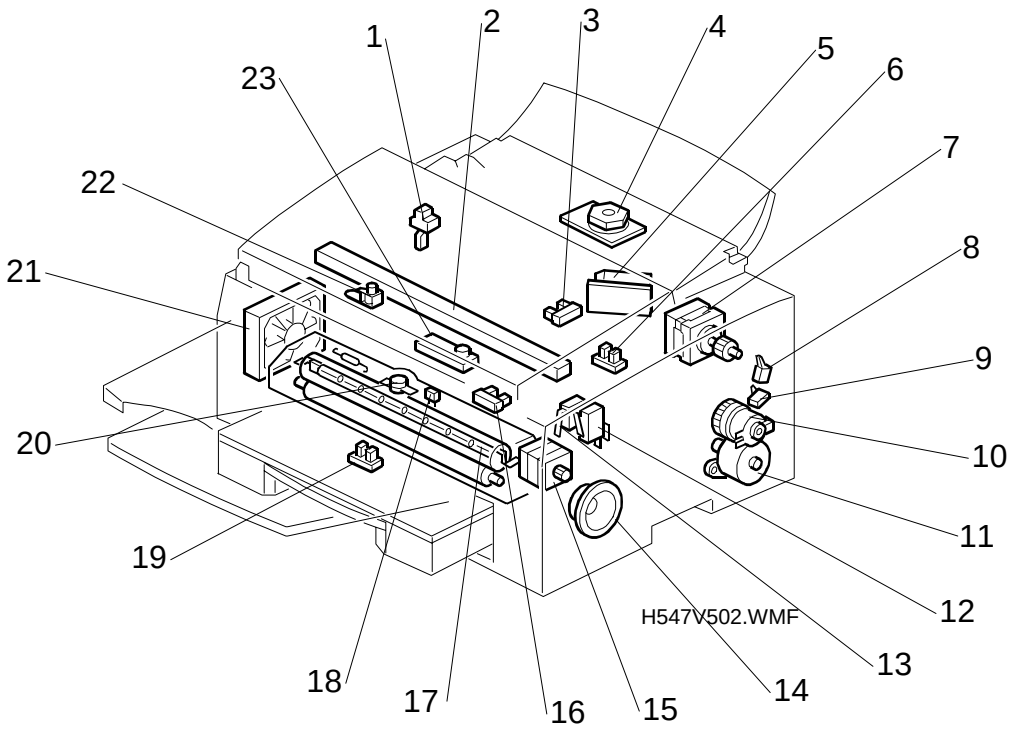
1.3.1 MECHANICAL COMPONENTS

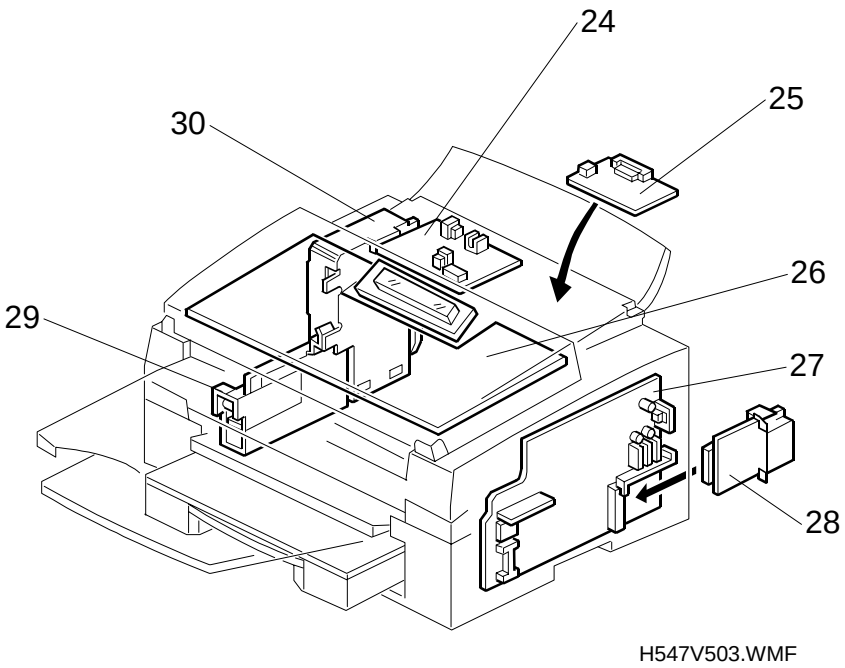


No	Name	Description
1	R2 Roller	Feeds the document through the scanner.
2	R1 Roller	Feeds the document through the scanner.
3	Separation Roller	Allows one page into the scanner.
4	Document Feed Belt	Feeds the document into the scanner.
5	Pick-up Roller	Picks up document pages from the document table one at a time.
6	Pressure Plate	Applies pressure against the pick-up roller.
7	All-in-One Cartridge	Consists of the toner cartridge, cleaning unit, used toner tank, charge brush roller, application roller, development roller and OPC drum.
8	Laser Unit	Consists of the LDDR (Laser Diode Driver), focusing lens, hexagonal mirror motor, and other laser optic components.
9	Paper Feed Roller	Picks up the top sheet of paper from the stack in the cassette, and feeds it into the printer.
10	Separation Pad	Allows one sheet of paper into the printer.
11	Registration Roller	Carries out the registration process.
12	OPC Drum	The latent image is written to this organic photoconductor drum.

No	Name	Description
13	Transfer Roller	Applies a charge to the paper to pull the toner off the drum and onto the copy paper.
14	Hot Roller	Heat from this roller fuses the toner to the copy paper.
15	Fusing Pressure Roller	Applies pressure to the paper during the fusing process.
16	Paper Feed-out Rollers	Feed the paper out of the printer.
17	Hot Roller Strippers	Take the paper off the hot roller after fusing.
18	Cleaning Pad	Cleans up and spreads silicone oil on the surface of the hot roller.

1.3.2 ELECTRICAL COMPONENTS





1. PCBs

No	Name	Description
2	CIS (Contact Image Sensor)	This sensor reads and converts the light reflected from the document into an analog video signal.
5	LDDR (Laser Diode Driver)	This board drives the laser diode.
24	NCU (Network Control Unit)	This board contains relays and switches for interfacing the machine with the network and the handset.
25	DIU (Digital Interface Unit) for PCFE Option	This is an interface board for an optional PC Fax Expander (not available in some countries).
26	OPU (Operation Panel Unit)	This board controls the operation panel.
27	FCU (Facsimile Control Unit)	This board controls the machine. It contains the main CPU, flash ROM, system RAM, etc.
28	G4 Interface (SiG4 option)	This is an interface for the machine and an ISDN network.
29	Power Pack	Supplies high voltage to the charge brush roller, transfer roller and development rollers.
30	PSU (Power Supply Unit)	This board supplies power to the machine, and switches the fusing lamp on/off.

2. Motors

No	Name	Description
4	Polygon Mirror Motor	This high-speed dc motor drives the hexagonal mirror in the laser printer optics.
7	Main Motor	This stepper motor drives the All-in-One cartridge and the fusing unit.
11	Paper Feed Motor	This stepper motor drives the registration roller and the paper feed mechanisms in the cassettes.
15	Scanner Motor	This stepper motor drives the scanner.
21	Cooling Fan Motor	Cools the interior of the machine.

3. Sensors

No	Name	Description
1	Document Sensor	Detects the presence of a document in the feeder.
3	Paper End Sensor	Detects when the paper in the cassette has run out.
6	Paper Edge Sensor	Detects when the paper has passed the paper feed components.
8	Rear Upper Cover Switch	Detects whether the rear upper cover is open or closed.
9	Rear Lower Cover Switch	Detects whether the rear lower cover is open or closed.
16	Registration Sensor	Detects when paper reaches the registration roller.
19	Fusing Exit Sensor	Detects when the paper feeds out of the printer.
23	Toner End Sensor	Detects when the toner has run out.

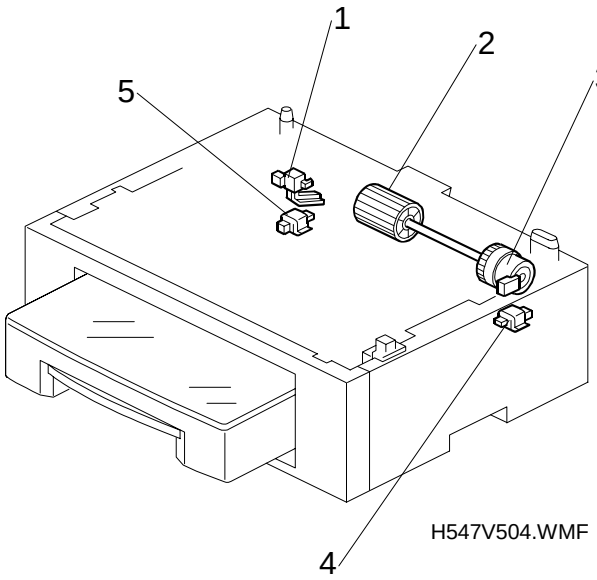
4. Interlock Switches

No	Name	Description
12 13	Interlock Switches	If the fusing unit cover and/or top cover are open, these switches interrupt the +5VLD power supply for the laser diode and the +24VD power supply for the power pack, motors, and other components.

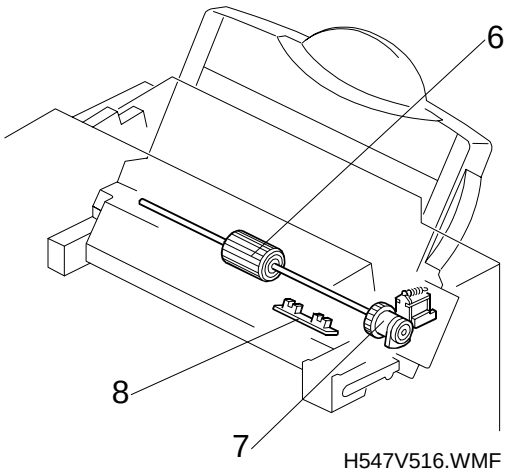
5. Others

No	Name	Description
10	Paper Feed Clutch	Transfers drive from the paper feed motor to the paper feed roller.
14	Monitor Speaker	Allows the user to hear the telephone line condition.
17	Fusing Lamp	The heat from this lamp fuses the toner to the paper.
18	Thermistor	Monitors the temperature on the hot roller surface.
20	Thermostat	Interrupts the ac power supply for the fusing lamp if the thermostat temperature exceeds 400°C.
22	Stamp Solenoid	This turns on to stamp the document.

6. Optional Paper Feed Unit and Multi Purpose Feeder



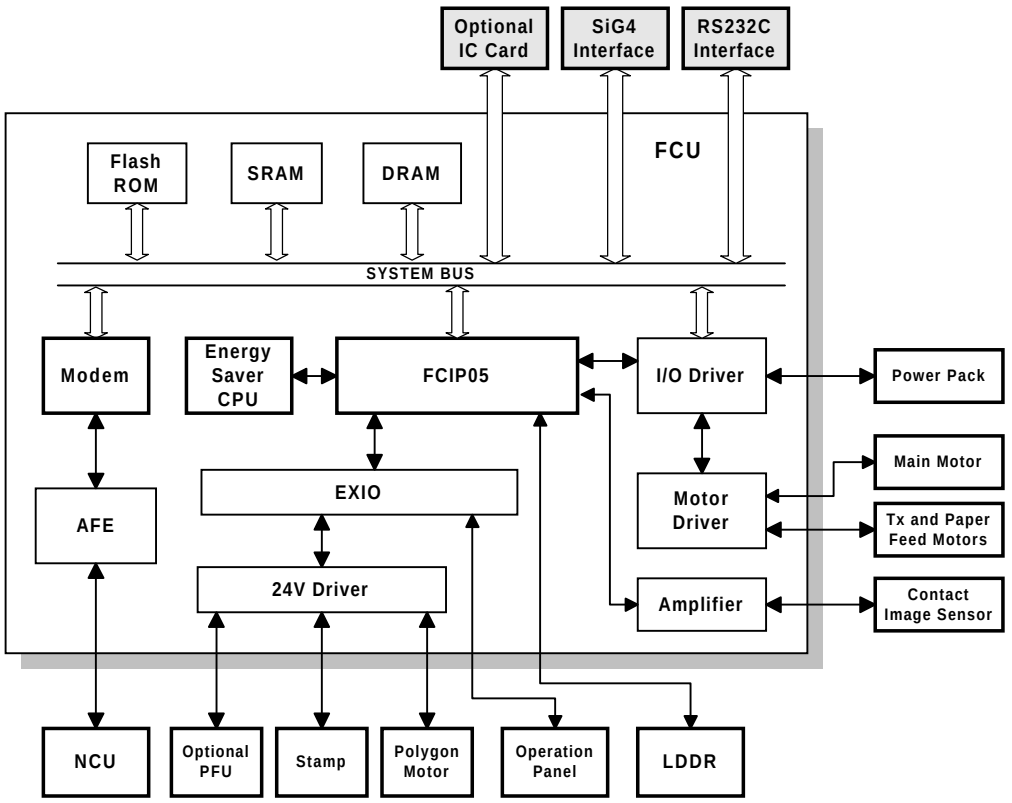
H547V504.WMF



H547V516.WMF

No	Name	Description
1	Paper End Sensor (Paper Feed Unit)	This detects when the paper in the cassette has run out.
2	Paper Feed Roller (Paper Feed Unit)	Picks up the top sheet of paper from the stack in the cassette, and feeds it into the printer.
3	Paper Feed Clutch (Paper Feed Unit)	Transfers drive from the paper feed motor in the mainframe to the paper feed roller in the cassette.
4	Cassette Switch (Paper Feed Unit)	This detects whether the cassette is installed or not.
5	Rear Cover Switch (Paper Feed Unit)	This detects whether the rear cover is open or close.
6	Paper Feed Roller (Multi-purpose Feeder)	Picks up the top sheet of paper from the stack in the feeder, and feeds it into the printer.
7	Paper Feed Solenoid (Multi-purpose Feeder)	Transfers drive from the paper feed motor in the mainframe to the paper feed roller in the feeder.
8	Paper End Sensor and Paper Width Sensor (Multi-purpose Feeder)	Paper end sensor: This detects when the paper in the feeder has run out. Paper width sensor: This detects the paper width installed in the feeder.

1.4 OVERALL MACHINE CONTROL



H547V505.WMF

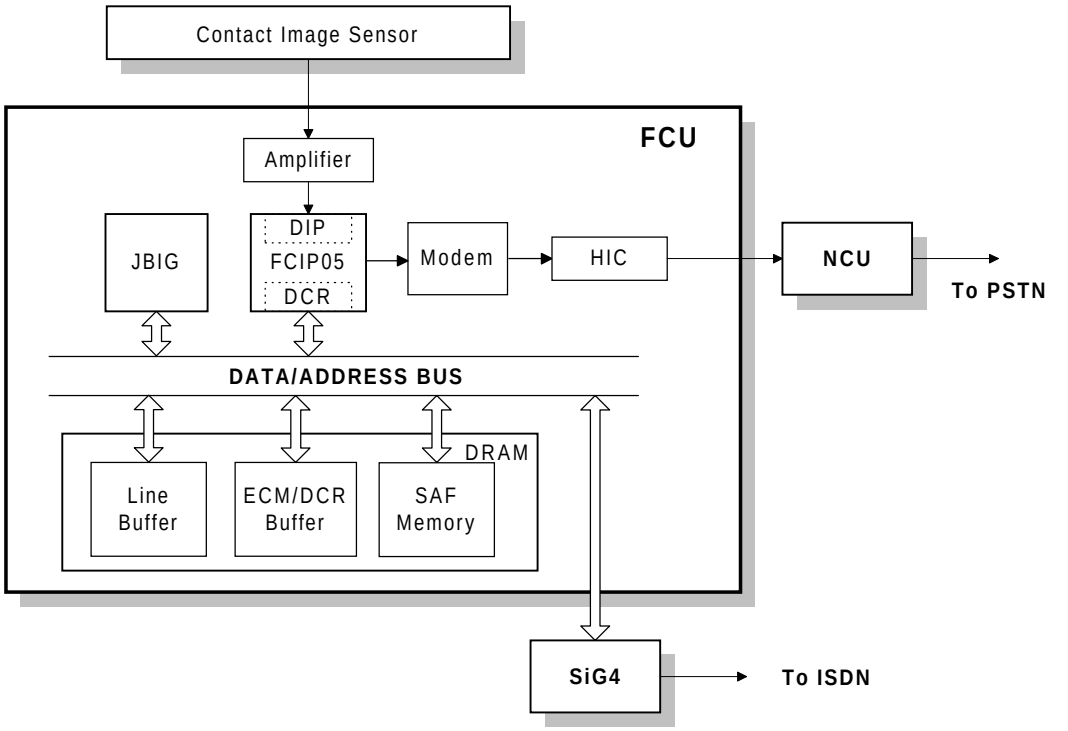
The FCU (Facsimile Control Unit) contains logical components for overall system control, and a direct interface to the IC card, G4 interface (SiG4), and an RS232C interface.

NOTE: The RS232C interface is not available in some countries.

There are two CPUs in the machine: the main CPU (FCIP05) and the energy saver CPU. The FCIP05 contains components such as the 8 bit CPU (RU8), DIP (Digital Image Processor), LIF (Laser Interface), DCR (Data Compression and Reconstruction) and DMA Controller.
In energy saver mode, the main CPU switches off and the energy saver CPU takes over.

1.5 VIDEO DATA PATH

1.5.1 TRANSMISSION



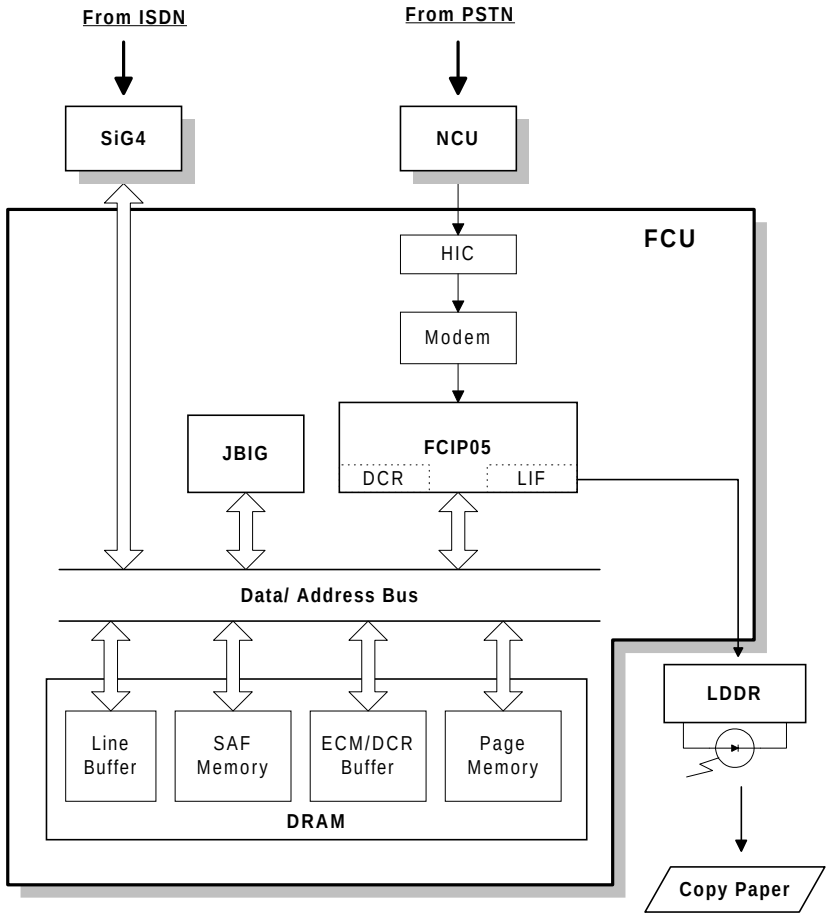
H547V509.WMF

Immediate Transmission:
Scanned data from the contact image sensor passes to the DIP in the FCIP05. After analog/digital video processing, the DCR (or the JBIG LSI if JBIG compression is to be used) compresses the data for transmission. The compressed data passes through the DCR buffer, then to the ECM memory before entering the telephone line through the modem.

Memory Transmission:
First, the scanned data is stored in the SAF memory after compression in the DCR. At the time of transmission, the DCR decompresses the data from the SAF memory, then compresses it again (or the JBIG LSI compresses the data if JBIG compression is to be used) for transmission. The compressed data passes through the DCR buffer, then to the ECM memory before entering the telephone line through the modem.
During G4 transmission, the compressed data from the DCR buffer passes through the SiG4 board.

Parallel Memory Transmission
This feature allows the machine to scan a document into the SAF memory and send the same document simultaneously.
The machine stores the processed video data in the SAF memory and sends the data through modem at the same time.

1.5.2 RECEPTION

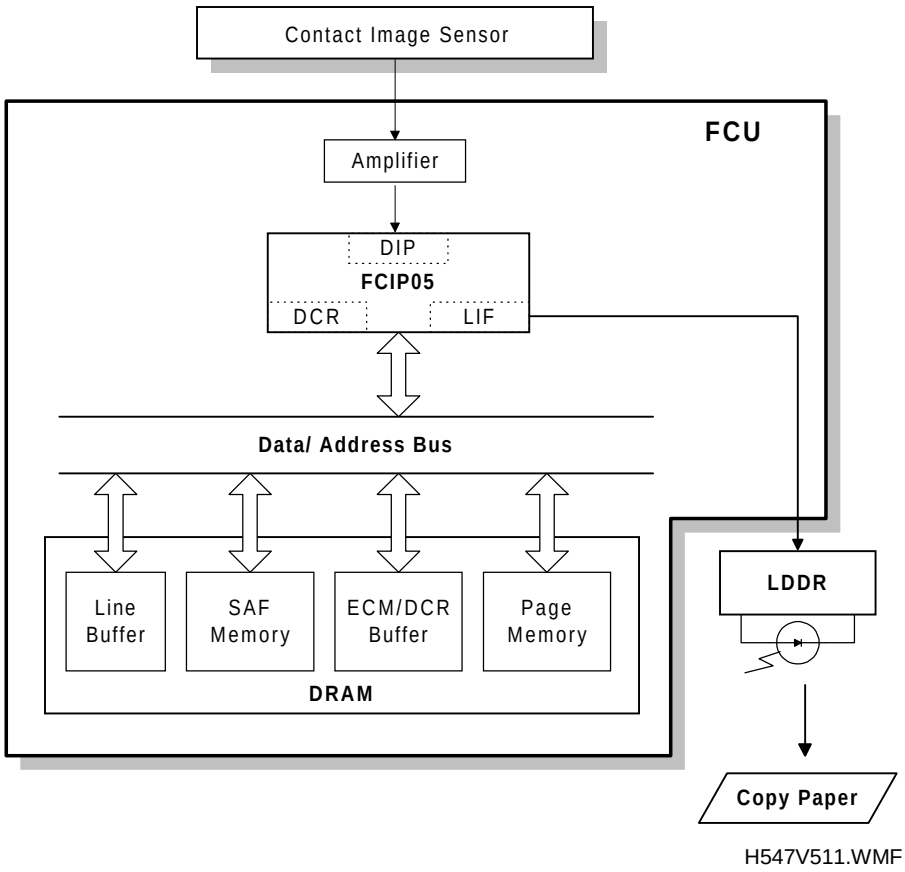


H547V510.WMF

Data from the line passes to the modem through the NCU and hybrid integrated circuit (HIC). After the modem demodulates the data, it passes through the ECM memory, DCR buffer, then to the DCR (or the JBIG LSI), which decompresses it into raster image data. At the same time, the compressed data passes to the SAF memory as a backup in case of mechanical problems during printing (substitute reception).
During G4 reception, data from the ISDN line passes to the DCR for decompression.

The raster image data then passes to the page memory for printing. After a page of data has been stored in the page memory, the data is sent to the LDDR through the LIF.

1.5.3 COPYING



H547V511.WMF

Single copy

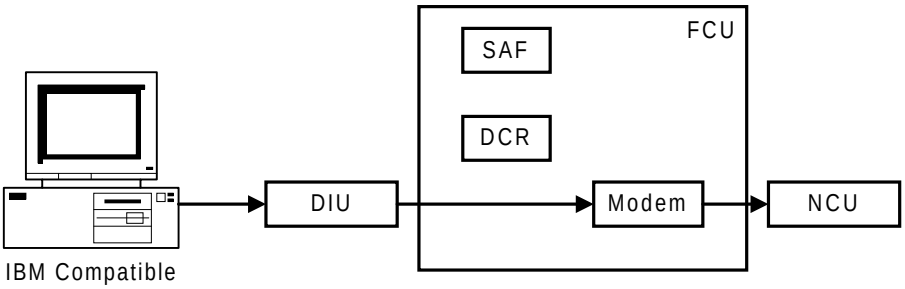
The scanned data passes to the page memory after video processing in the DIP. After a page of data has been stored in the page memory, the data is sent to the LDDR through the LIF.

Multi-page copy

The scanned data passes to the SAF memory after video processing (DIP) and compression (DCR). After a page of data has been stored in the SAF memory, the data passes to the DCR again for decompression, and then it passes to the page memory for printing.

1.5.4 CLASS2 FAX COMMUNICATION

Direct transmission

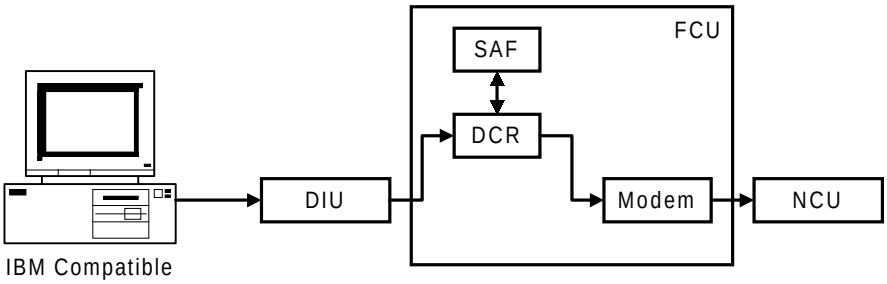


H547V520.WMF

The host computer sends commands and image data to the machine through the DIU (Digital Interface Unit) during transmission.

NOTE: 1) Group dials programmed in the machine cannot be used.
2) T.30 optional protocols (e.g., BFT) are not supported by class 2 fax communication.
3) ISDN G4 numbers programmed in quick or speed dials cannot be used.
4) ISDN G3 communication is not possible for PC direct transmission.

Memory Transmission

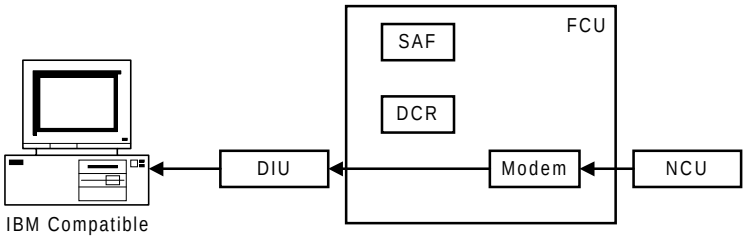


H547V521.WMF

The host computer sends destination number(s) and image data to the machine through the DIU during transmission. The machine stores the image in the SAF memory, then makes a fax transmission.

NOTE: 1) If the memory overflows while storing the first page into SAF memory, the machine does not start the transmission.
2) If the memory overflows while storing the second or subsequent page into SAF memory, the machine transmits all the successfully stored pages.
3) When fax numbers programmed in the machine's quick or speed dials are specified using the PC fax application, all the specified numbers must have been programmed in the fax machine.
4) T.30 optional protocols (e.g., BFT) are not supported by class 2 fax communication.

Direct Reception

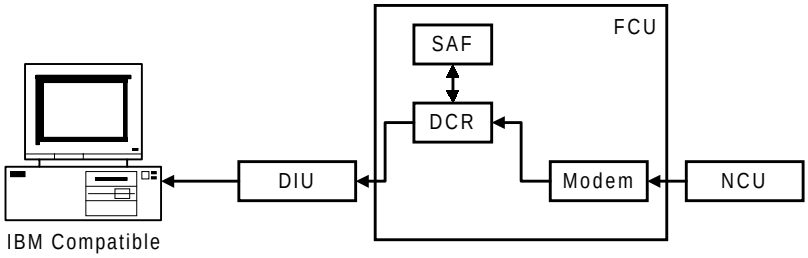


H547V522.WMF

The machine transfers received image data directly to the host PC without storing it into SAF memory.

NOTE: 1) If the host PC is not ready to receive a fax message, the machine receives the message into SAF memory if the user parameter switch 0E bit 1 is turned on.
2) Even if the SAF memory is full, the machine starts fax reception if there is no mechanical error in the printer.

Memory Reception



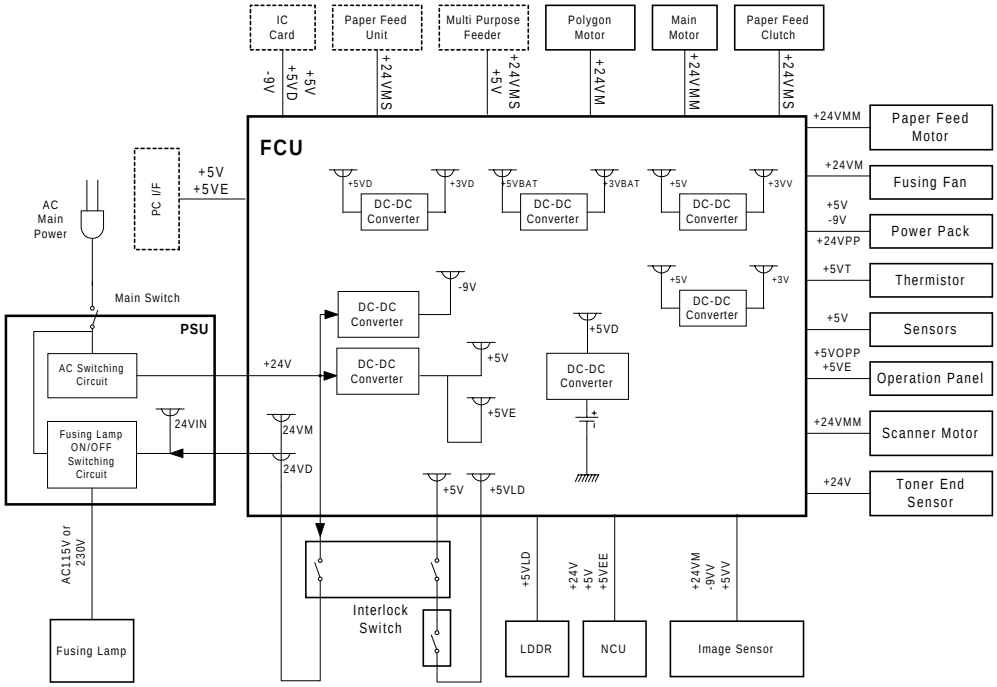
H547V523.WMF

The machine receives a fax message in the SAF memory, then transfers data to the host computer after the reception has finished. The machine prints the received message after transferring data to the host if user parameter 14 -bit 3 and 4 is set to “1, 1: Print”.

NOTE: 1) If an error occurs due to cable disconnection, the PC fax application must be restarted to receive the message.
2) Manual reception from the PC fax application is not supported.

1.6 POWER DISTRIBUTION

1.6.1 DISTRIBUTION DIAGRAM

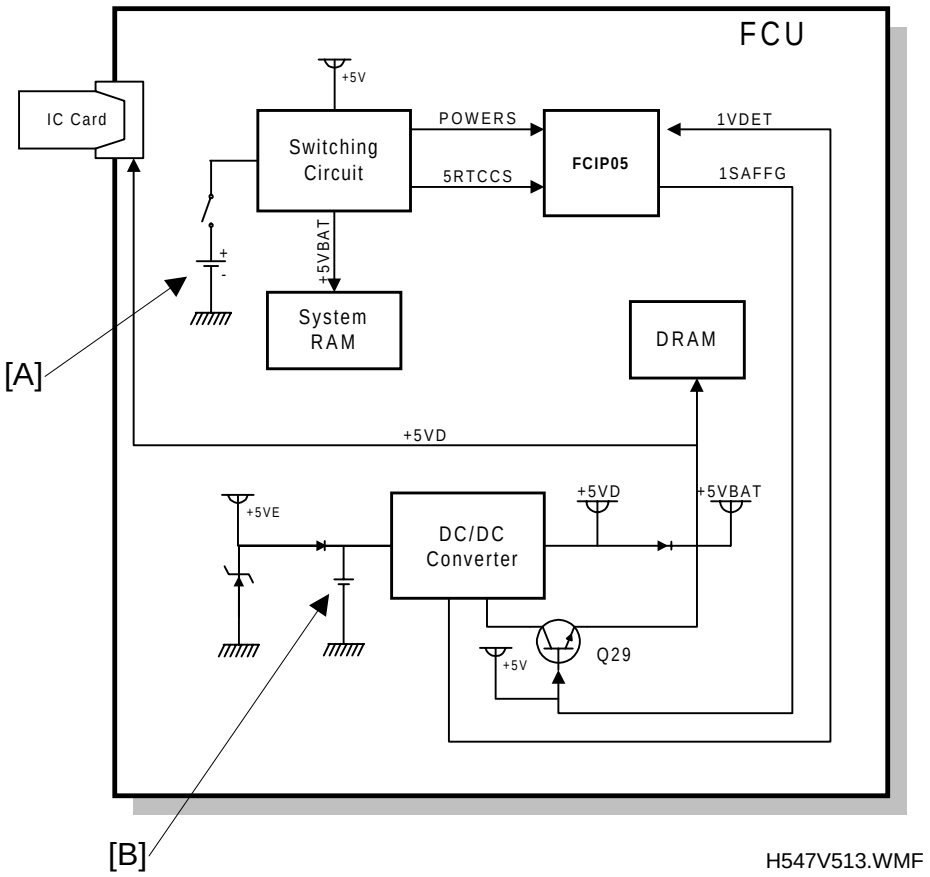


H547V515.WMF

The PSU supplies +24V dc power to the FCU. The FCU converts the +24V to the following supplies.

+24V	Normally on when the main switch is.
+24VD	This is interrupted if the fusing unit cover interlock switch opens.
+24VIN	Supplies +24V to the fusing unit on/off switching circuit. It is interrupted if the fusing unit cover interlock switch opens.
+24VMM	For the scanner, paper feed, and main motors.
+24VPP	For the power pack.
+5V	Normally on when the main switch is.
+5VBAT	Supplies back up power to the system RAM on the FCU to back up the programmed data. A lithium battery generates +5VBAT.
+5VD	Supplies back up power for the DRAM and the optional IC card on the FCU. It can back up stored data for one hour after the power is switched off. A rechargeable battery on the FCU generates +5VD.
+5VE	Detects an activation signal from the NCU, SiG4 (G4 Unit), document feeder, or operation panel when the machine is in energy saving mode.
+5VLD	Supplies the laser diode. It is interrupted if the fusing unit cover interlock switch opens.
+5VT	For the thermistor.
+5VV	This is a more stable power supply than +5V. It is used for the contact image sensor.
+3V	For the FCIP05 internal circuits.
+3VBAT	For the FCIP05 SRAM backup
+3VD	For the FCIP05 DRAM backup.
+3VV	For the FCIP05 AD convertor.
-9V	For the image sensor.

1.6.2 MEMORY BACK-UP CIRCUIT



The +5VBAT supply from the lithium battery [A] backs up the system RAM, which contains system parameters, programmed telephone numbers, and the real time clock in the main CPU. The 5RTCCS signal tells the main CPU whether the back-up power (+5VBAT) is coming from the battery or from the +5V power supply.

A rechargeable lithium battery [B] and the DC/DC converter on the FCU back up the DRAM (SAF memory) for one hour, if there is data in the SAF memory and the power is switched off. While the main power is on, the +5VE supply recharges the battery. The battery recharges in 5 or 6 days.

The battery [B] generates about 3 volts (max. 3.2 volts). The DC/DC converter raises this voltage to 5 volts so it can be used as the +5VD supply for the SAF backup. The CPU monitors the voltage of the +5VD supply with the 1VDET signal. When the battery has run down, and the voltage is lower than 4.4 volts, the CPU stops the DC/DC converter by dropping 1SAFFG to low and the machine stops backing up the memory.

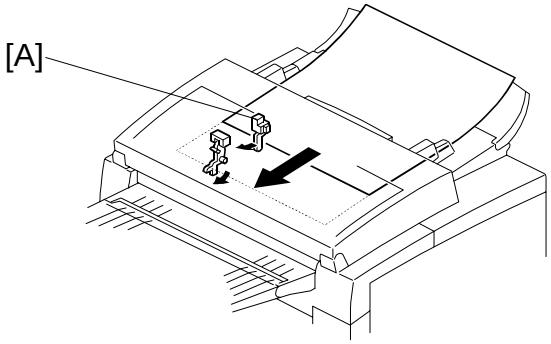
NOTE: There is no battery switch for the battery [B].

2. DETAILED SECTION DESCRIPTIONS

2.1 SCANNER

2.1.1 MECHANISMS

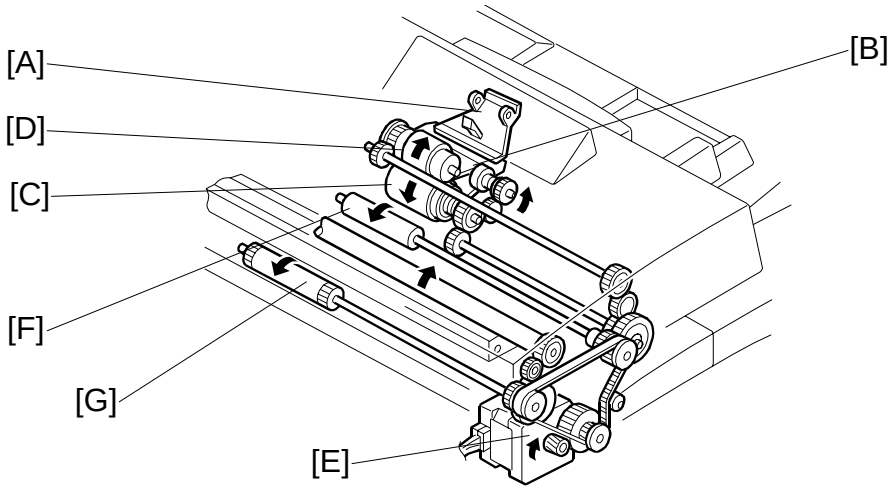
Document Detection



H547D512.WMF

The document sensor [A] detects a document when it is placed in the ADF.

Pick-up and Separation and Drive Mechanism



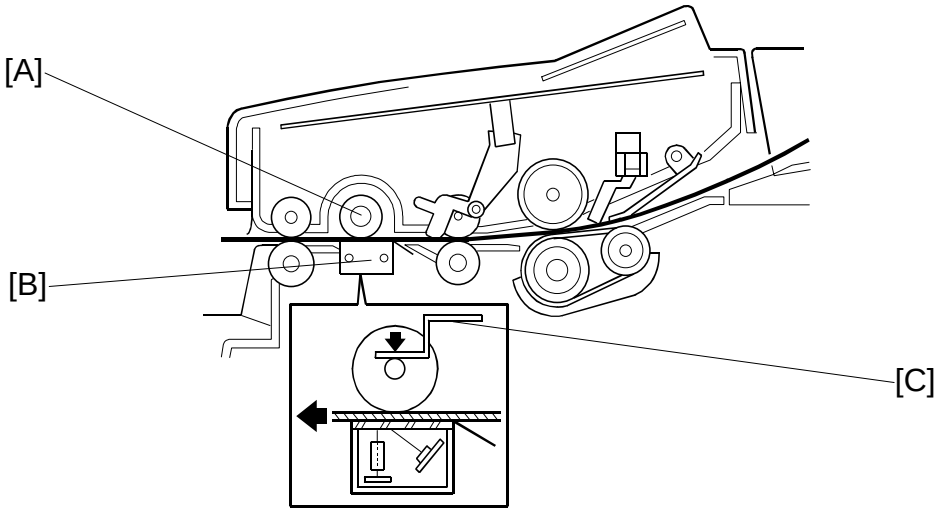
H547D502.WMF

The pressure plate [A] aligns the leading edges of the pages of the document. When the machine starts feeding the document, the mechanical clutch in the ADF roller unit lifts up the pick-up rollers [B] to feed the bottom sheet of the document. Then, the feed belt [C] feeds the sheet into the scanner.
The separation roller [D] prevents the feed belt from feeding more than one sheet at a time.

The scanner motor [E] drives the pick-up rollers [B], feed belt [C], R1 roller [F], and R2 roller [G].

Cross Reference
ADF mechanical clutch mechanism: Group 3 Facsimile Manual, page 2-2-8.
Maximum document length: Scanner Switch 00, bits 2 and 3.

Image Scanning



H547D503.WMF

The image sensor [B] consists of a row of 1728 photosensitive elements (Letter width x 8 dots/mm). The document reflects light from the LED array and the rod lens array focuses it onto the image sensor. Because of the short optical path inside the CIS, the focal depth is much shorter than for a CCD type scanner. Consequently, the spring plates [C] push the white roller [A] so that the document surface always touches the exposure glass at the scan line.

The image sensor assembly is factory adjusted, so it does not require adjustment or replacement in the field.

The image sensor scans the original one line at a time, and outputs an analog signal for each line. The voltage from each element depends on the intensity of the light reflected from the original onto the element; the light intensity depends on the darkness of the document area it was reflected from.

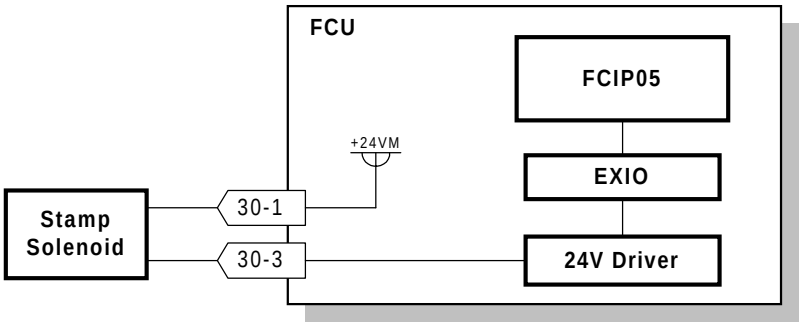
The white roller [A] must be kept clean, because the machine scans it every page to calibrate the white level (auto shading).

Scanning Speed

The scanning speed for each resolution is as described below.

Resolution	Scan Speed (A4)
Standard - Memory Tx	1.85 s
Standard - Immediate Tx	3.68 s
Detail	3.68 s
Fine	7.35 s

Stamping



H547D570.WMF

The machine stops the document at the stamping position after the page is transmitted (immediate transmission) or scanned into memory (memory reception) successfully.

The machine drops the signal at CN30-3 to activate the stamp solenoid. Then the original is fed out of the sensor.

2.1.2 JAM CONDITIONS

The main CPU detects a document jam if one of the following conditions occurs.

Jam Condition	Description	Error Code
Non-feed	The feed mechanism attempts to feed the paper once every second for a maximum of 6 seconds. If the scan line sensor does not detect the document within 6 seconds, the monitor displays an error message.	1-00
Incorrect sensor conditions	The scan line sensor turns on while the document sensor is off.	
Maximum document length exceeded	The scan line sensor does not turn off after the maximum document length has fed through it. This occurs after 11 seconds at standard resolution for memory TX; 23 seconds at standard resolution for immediate TX or detail resolution; or 46 seconds at fine resolution (all these times are for a 1.2-m long document).	1-01
Cover open	While the ADF is working, the ADF cover is opened.	No error code
Error during feed-out	The scanner motor reverses when the final page of the document feeds out of the scanner and/or when removing a jammed document. This error occurs when placing a document into the feeder while the motor is rotating.	No error code

2.1.3 RESOLUTION UNIT CONVERSION

mm-inch Conversion

This machine's scanner is designed in mm resolution units. However, the other terminal may have an inch-based printer. The machine can convert the scanned data into inch-format for transmission.

The following table shows the actual transmitted data resolution units in various cases.

Please note that other models (such as FX4 and FR4) convert from inches to mm units whereas this machine converts from mm to inches.

G3 Immediate and Memory Transmission

Receiving terminal's resolution units		inch	mm	inch/mm
Mm-inch conversion (com switch 14 bit 0)	On	inch	mm	mm
	Off	mm	mm	mm

G4 Transmission

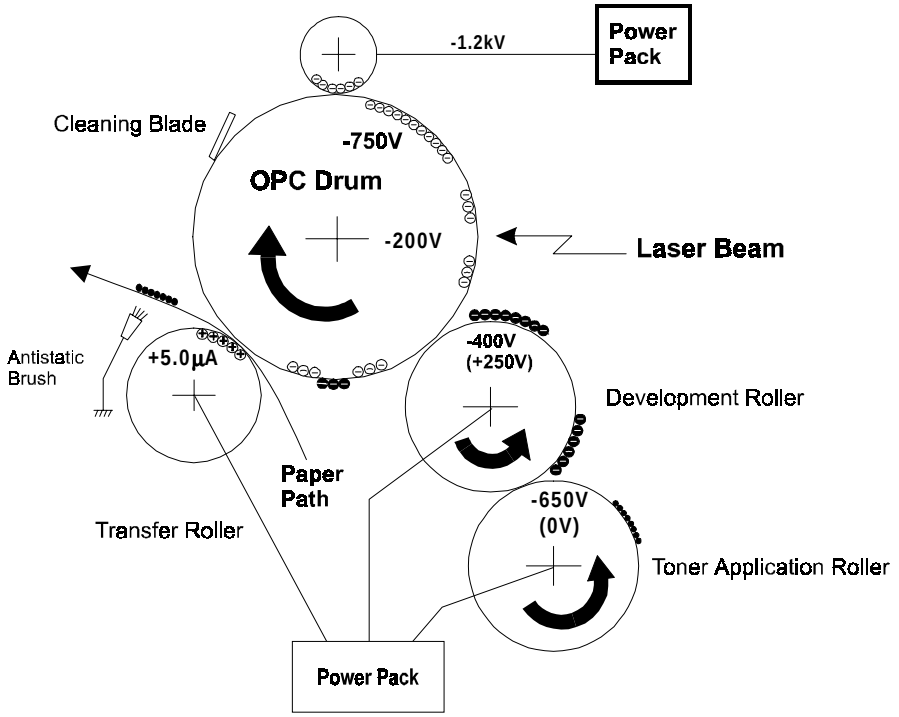
When the above switch is off (Communication Switch 14 bit 0, the default setting is off) the machine transmits the data in mm-format without conversion while informing the other terminal that it is an inch based transmission.

Cross Reference

Inch to mm conversion (mm to inch): Communication Switch 14, bits 0 and 1

2.2 PRINTING

2.2.1 PRINTING PROCESS - OVERVIEW

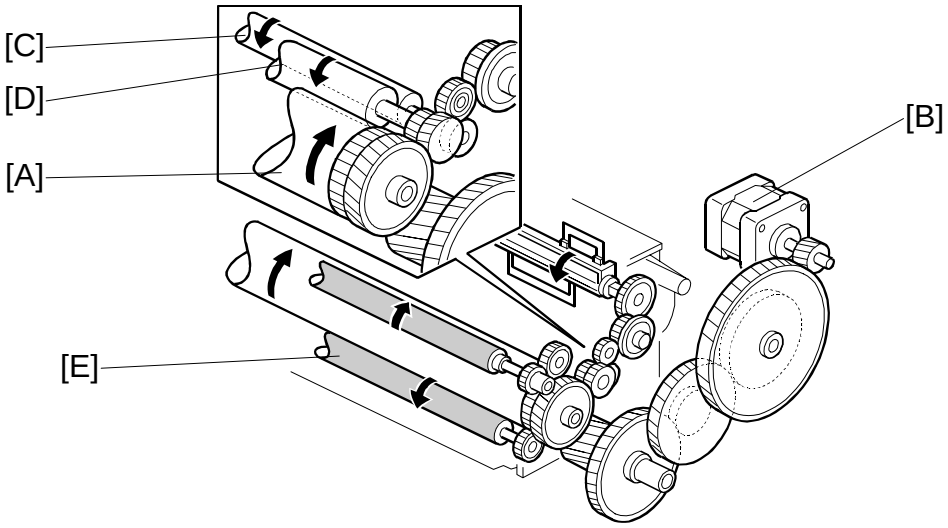


H547D521.WMF

This machine uses a “write-to-black” system, with negative toner.

- The charge-brush roller gives the drum surface an approximate negative charge of -750 V.
- The exposed area on the drum drops to about -200 V.
- The development roller carries toner to the latent image on the drum surface.
  The bias voltages during printing:
  Toner application roller : -650 V
  Development roller: -400 V
- The transfer roller pulls the toner from the drum onto the paper.
  A constant current of +5.0 µA is applied. The anti-static brush helps to separate the paper from the drum.
- The cleaning blade removes any toner remaining on the drum after the image transfers to the paper.
- This machine does not use quenching lamp.

2.2.2 OPC DRUM

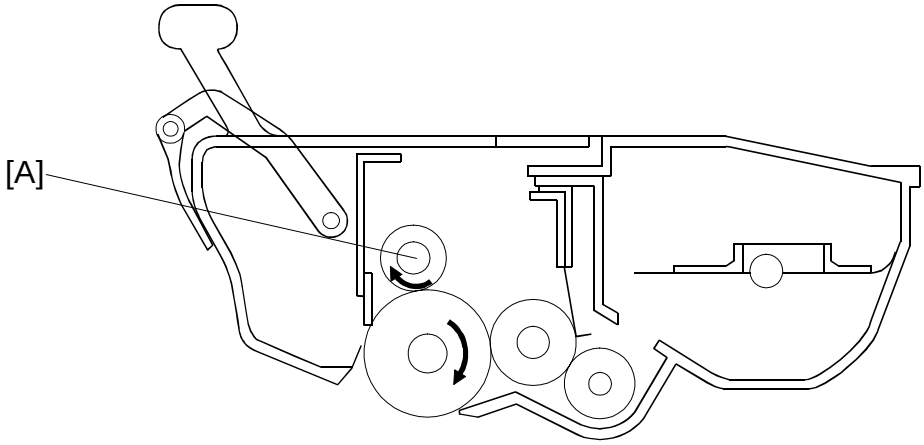


H547D504.WMF

The cartridge contains an organic photo-conductor drum [A]. The diameter of the drum is 24 mm. The main motor [B] drives it through a gear train. The same gear train also drives the toner application roller [C], development roller [D], and transfer roller [E].

The drum, development roller, fresh and used toner tanks, and cleaning mechanism are all included in the cartridge, which is known as the “All-in-One” cartridge.

2.2.3 CHARGE

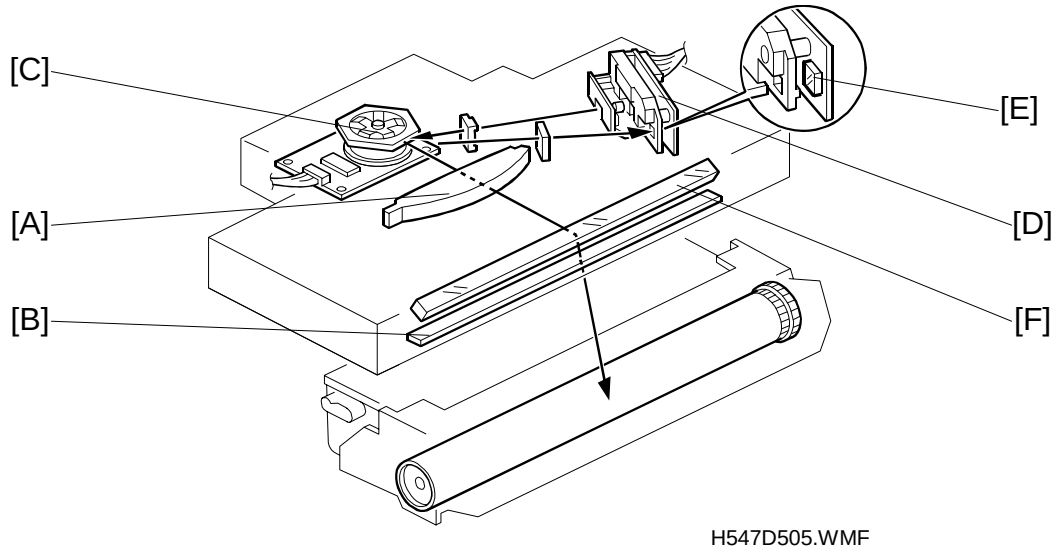


H547D517.WMF

The cartridge contains a charge brush roller [A]. The diameter of the roller is 12 mm. The charge brush roller does not generate ozone. The power pack applies a constant voltage of about –1.2 kV. The charge brush roller gives the drum surface a negative charge (-750V).

2.2.4 LASER EXPOSURE

Overview



H547D505.WMF

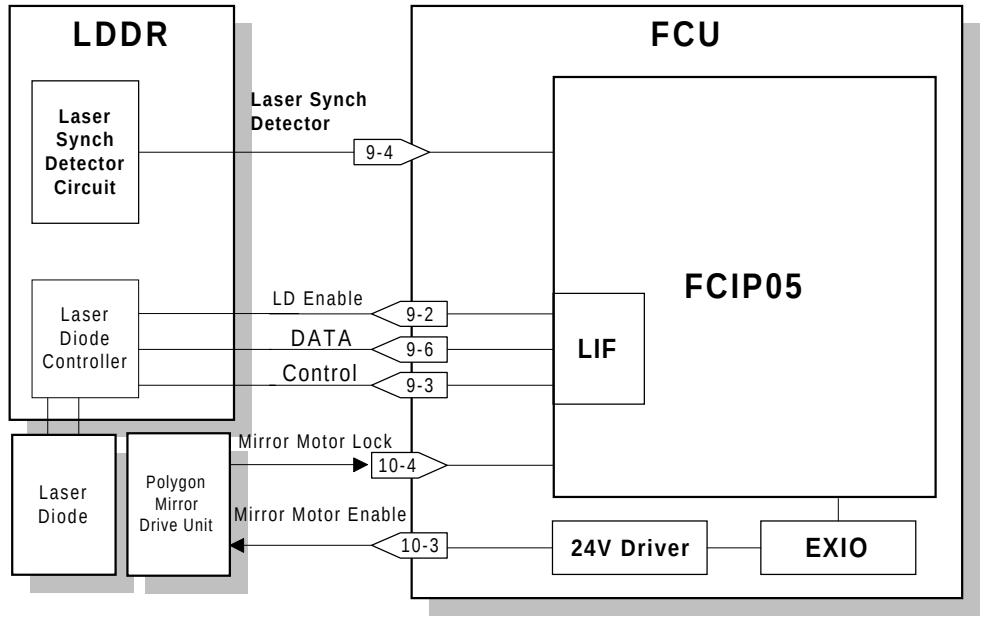
- The focusing lens [A] is a double toroidal lens that has a barrel toroidal surface on both sides.
- The shield glass [B] prevents toner and dust from entering the laser optics area.
- Mirror motor [C] speed: 10086.2069 rpm (16 dots/mm)
- The strength of the beam emitted from the LD unit [D] is 4 mW with a wavelength of 780 nm. The photo transistor [E] inside the LD unit synchronizes the laser main scan.
- The mirror [F] reflects the laser beam onto the drum.

The charge on the exposed areas of the drum drops to about -200V while non-exposed areas remain at around -750V.

As a mechanical safety feature, a shutter slides to block the laser beam path whenever the upper unit is opened.

Cross Reference
Group 3 Facsimile Manual: section 4-3-3

Block Diagram



H547D506.WMF

The LIF (Laser Interface) circuit inside the FCIP5 monitors and controls the laser diode timing (FCU CN9-3), and transfers data for printing to the laser diode (FCU CN9-6).

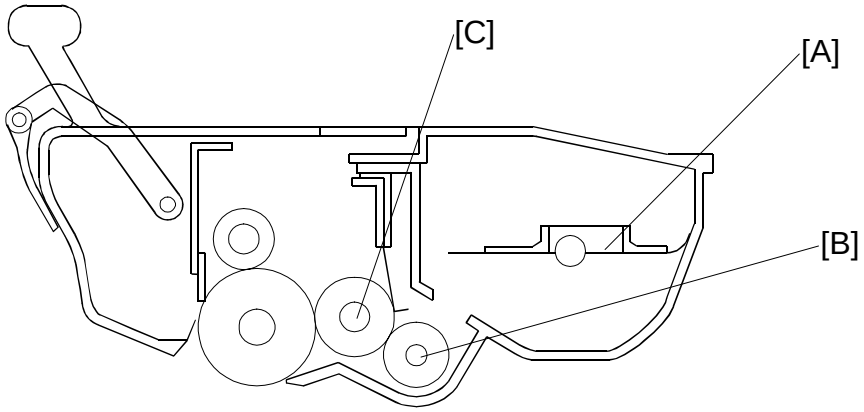
Cross Reference
Group 3 Facsimile Manual: page 4-3-13

Error Conditions

LD Failure:
The machine detects LD failure when it does not detect the laser synchronization signal within 10 ms of the LD ready signal. When this occurs, the machine warns the customer with the Call Service indicator (error code 9-20).

Mirror Motor Failure:
The machine detects a mirror motor error when the FCU CN10-4 signal does not go low within 10 seconds of the polygon mirror motor turning on.
The machine also detects a mirror motor error when the FCU CN10-4 signal goes back to high for 3 seconds or more during mirror motor operation. When either of these errors occurs, the machine warns the customer with the Call Service indicator (error code 9-23).

2.2.5 TONER SUPPLY



H547D519.WMF

This machine uses mono-component toner, composed of resin and ferrite. The toner mixing bar [A] stirs and carries toner to the toner application roller [B]. The toner application roller supplies toner to the development roller [C].

The main motor drives the toner supply mechanism through a gear train.

Since the toner tank and the development unit is composed in one unit, initial toner supply mode is not required for this machine.

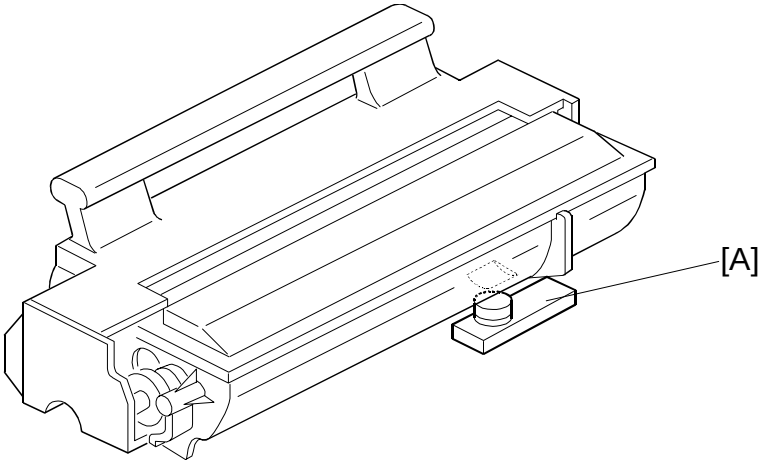
Cartridge Detection

This machine does not have toner cassette detection mechanism. It only detects output from the toner end sensor.

At the following times, the toner end sensor detects whether a cartridge is installed in the machine.

- At power-up.
- When the machine comes back to normal mode from the level 2 Energy Saver Mode.
- After opening and then closing the cover.

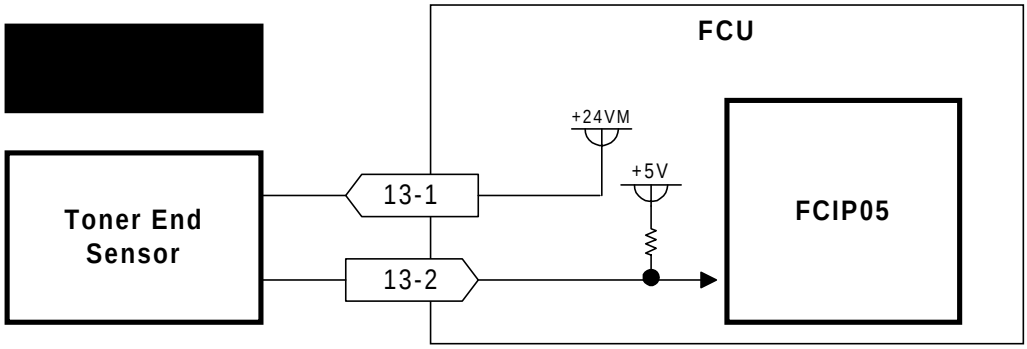
Toner End Detection



H547D516.WMF

The toner end sensor [A] below the toner tank detects toner near-end.

While the main motor rotates, the machine detects toner end by the voltage output from the toner end sensor. The voltage from the sensor is close to 5V when the toner tank is full and decreases when the toner is almost used up.



H547D507.WMF

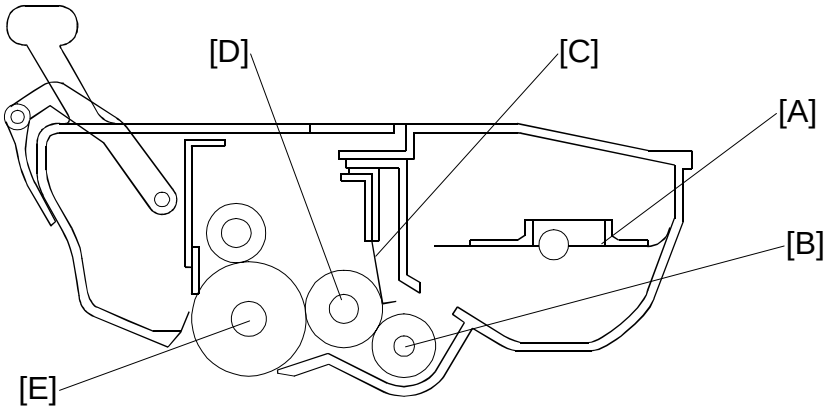
Toner near-end condition: When the cpu detects a low output (below a certain threshold) from the toner end sensor for a few seconds, the cpu starts to blink the Add Toner indicator (LED). This is the toner near-end condition.

Toner end condition: After toner near-end is detected, the machine can print 100 more sheets, then the cpu disables printing (this is the toner end condition).

The machine clears the toner near-end or toner end condition when the power is switched off and back on or when the cover is opened and closed, if the output from the toner end sensor goes back high again.

NOTE: If the toner end sensor is accidentally disconnected, the machine cannot detect if the cartridge is installed. The machine assumes that there is still toner, even if the toner tank is empty.

2.2.6 DEVELOPMENT



H547D519.WMF

Overview

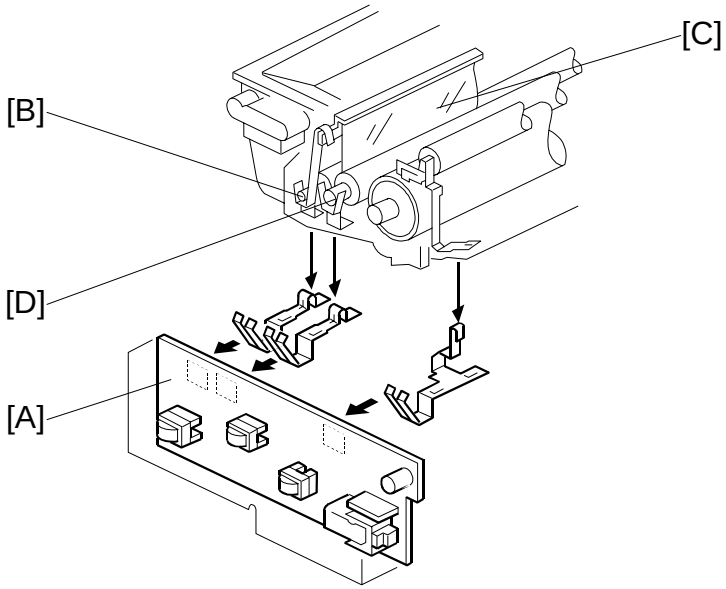
The toner supply bar [A] stirs and carries toner to the toner application roller [B]. The toner application roller is a sponge-like structure which carries toner to the development roller [D]. As the development roller [D] turns past the toner metering blade [C], only a thin coating of negatively charged toner particles stays adhered. (Refer to section 4-4-2 of the Group 3 Facsimile manual.)

During printing, the power pack applies a bias voltage of -650V to the toner application roller and another bias voltage of -400V to the development roller. The potential difference between these two rollers carries the toner from the toner application roller to the development roller.

The exposed area on the drum [E] is at -200V. The development roller applies toner to the latent image areas as they turn past the drum.

The development roller is made of soft rubber so it does not damage the surface of the drum.

Development Bias

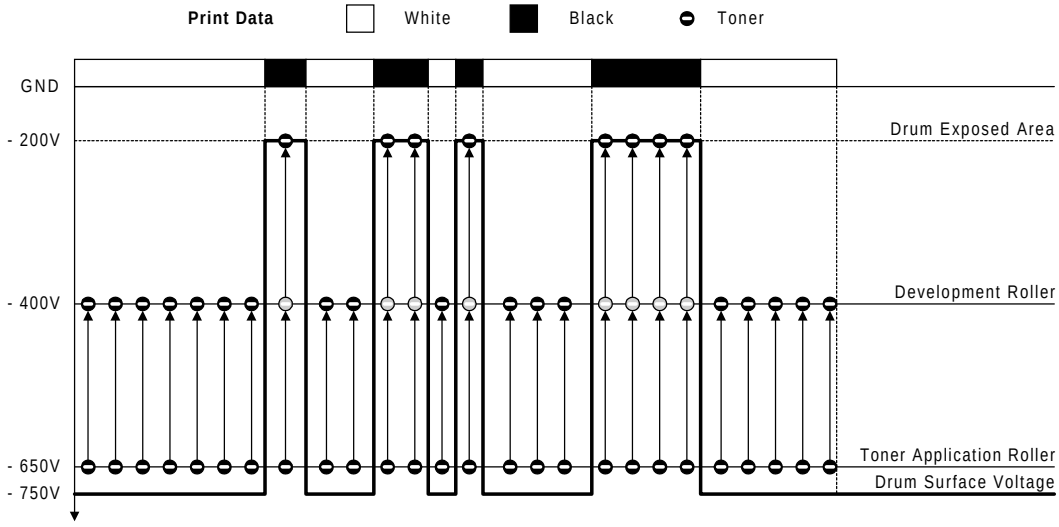


H547D518.WMF

The power pack [A] applies one voltage to the toner application roller [B] and toner metering blade [C], and a different voltage to the development roller [D].

Bias Control (During Printing)

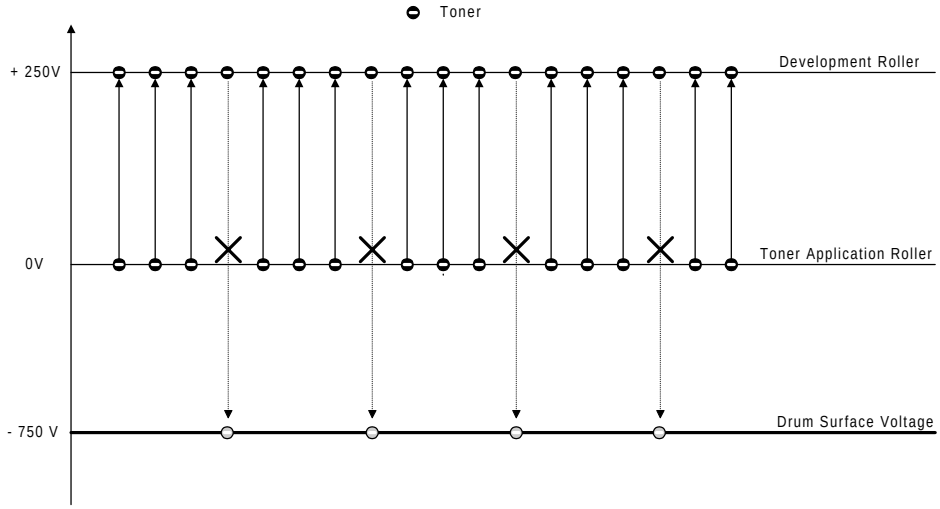
The power pack applies a charge of -650V to the toner application roller, and -400V to the development roller. Toner transfers from the toner application roller to the development roller and on to the laser-exposed areas on the drum as shown below.



H547D531.WMF

Bias Control (After Each Page)

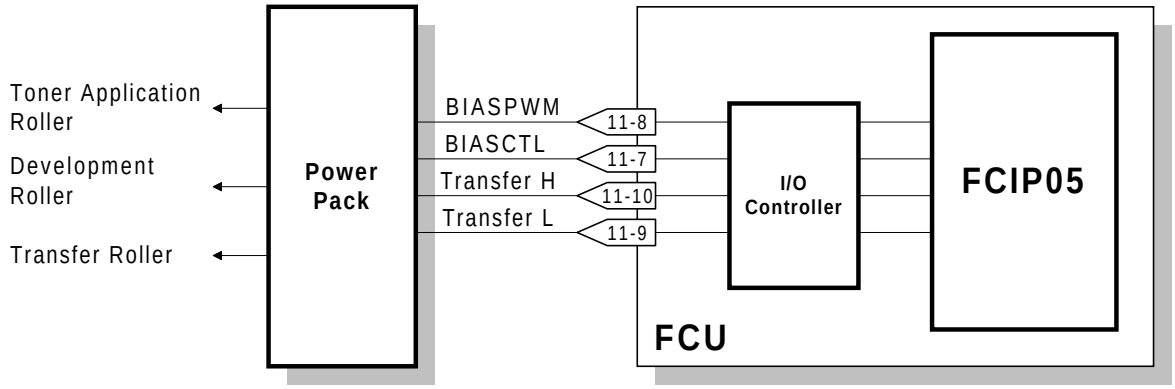
At the start and the end of any print process (including the cleaning mode), the power pack applies 0V to the toner application roller, and +250V to the development roller. This is to prevent toner from transferring to the drum.



H547D533.WMF

Note that the voltage difference between the toner application and development rollers is kept the same as in printing, at 250 V. This keeps the same amount of toner on the development roller at all times during the print run.

Bias Control Circuit



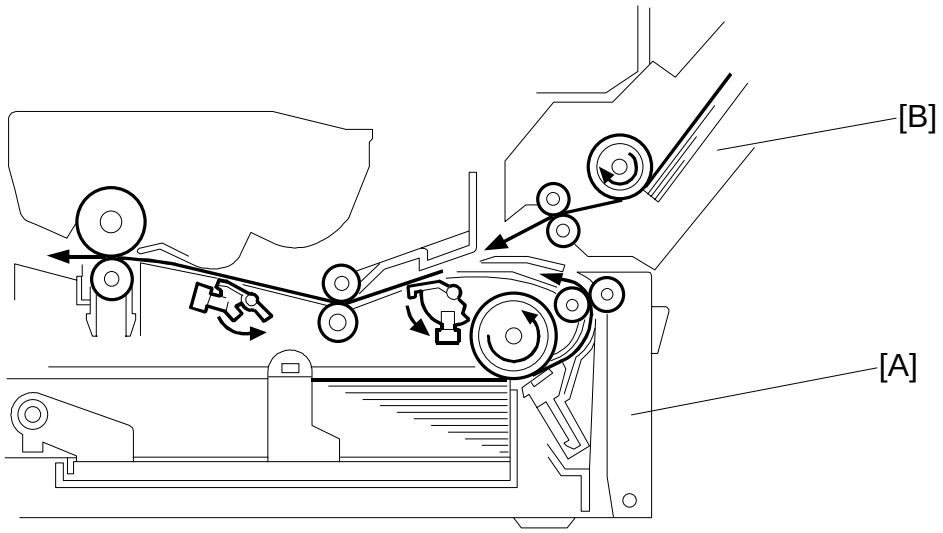
H547D509.WMF

The CPU controls the voltages to the toner application and development rollers through the I/O Driver, using the BIASCTL and BIASPWM signals as shown in the following table.

In	BIASCTL	Low	High	Low	High
	BIASPWM	On	On	Off	Off
Out	Toner Application Roller	- 650 V	0 V	Off	Off
	Development Roller	- 400 V	+ 250 V	Off	Off

2.2.7 PAPER FEED

Overview

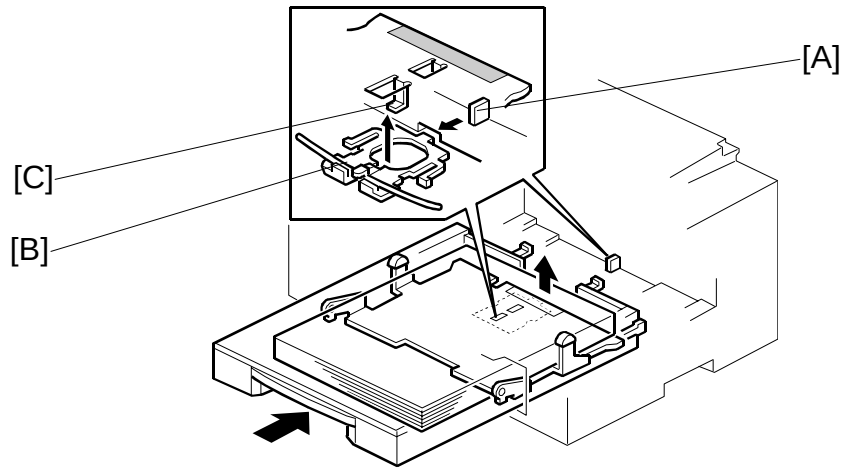


H547D511.WMF

The standard cassette [A] holds 250 sheets.
An optional paper feed unit, which holds up to 500 sheets, is available (only one of these can be installed). An optional multi-purpose feeder [B] is also available.

Paper Lift Mechanism

Standard Cassette

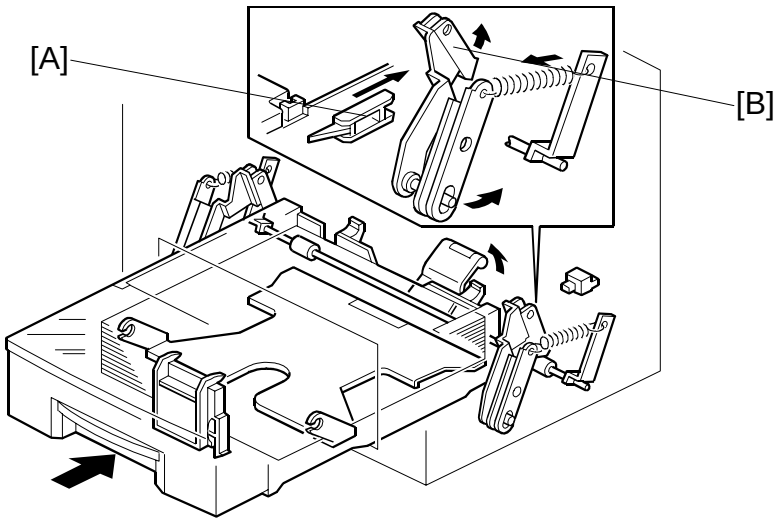


H547D525.WMF

After loading the paper and closing the cassette, the projection [A] pushes the slide lock [B] off the bottom hook [C].

Once the slide lock comes off, the pressure spring lifts the bottom plate.

Optional Paper Feed Unit

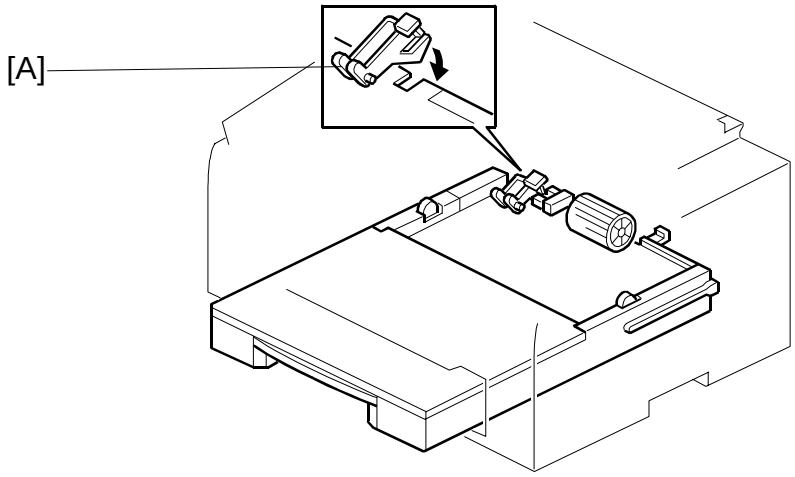


H547D513.WMF

After loading the paper and closing the cassette, the projection [A] pushes the lever [B], then the springs raise the bottom plate.

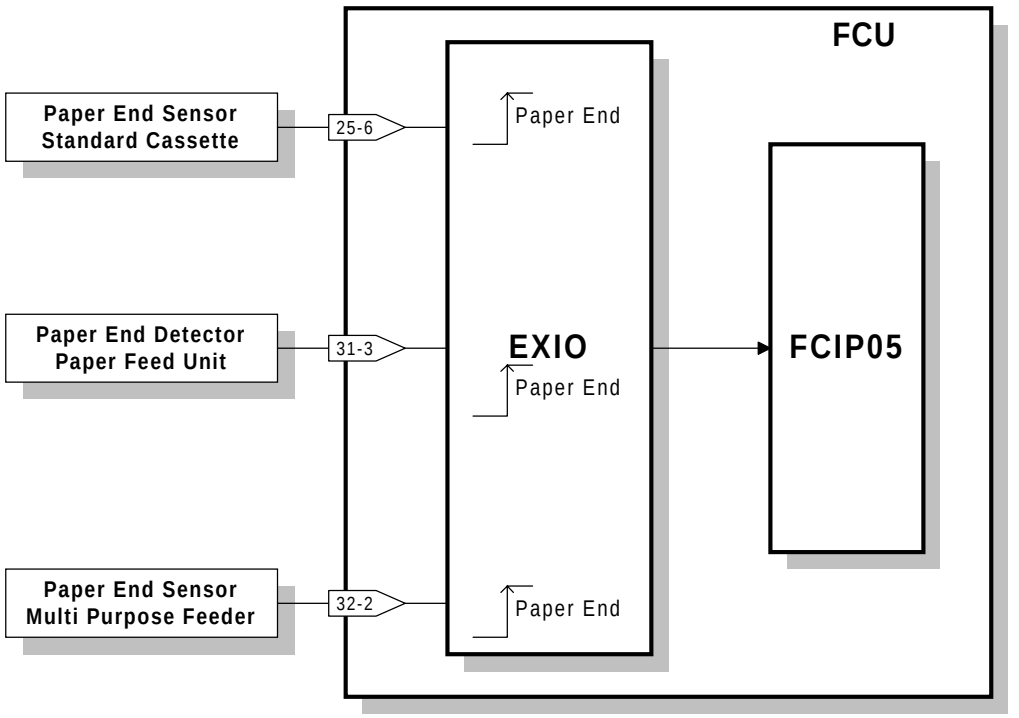
Paper End Detection

Standard Cassette/Optional Paper Feed Unit/Optional Multi-purpose Feeder



H547D527.WMF

When the cassette runs out of paper, the paper end sensor actuator [A] drops through a slot in the bottom plate.



H547D659.WMF

Pick-up and Separation

Standard Cassette and Optional Paper Feed Unit

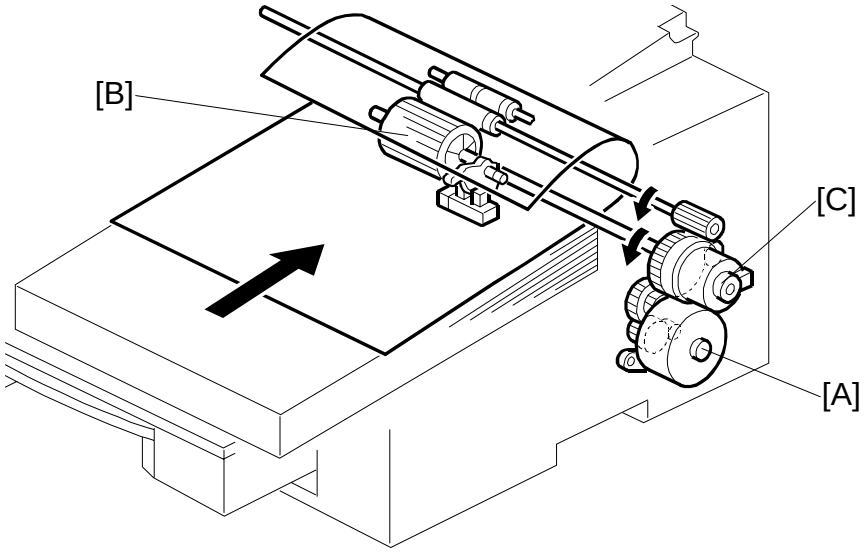
The pick-up and separation mechanism is a separation pad type. The separation pad and the paper feed roller allow only one sheet to feed.

Cross Reference
Group 3 Facsimile Manual: section 4-5-4

The paper feed motor in the mainframe starts to rotate when the printer is ready for printing.

Drive Mechanism

Standard Cassette

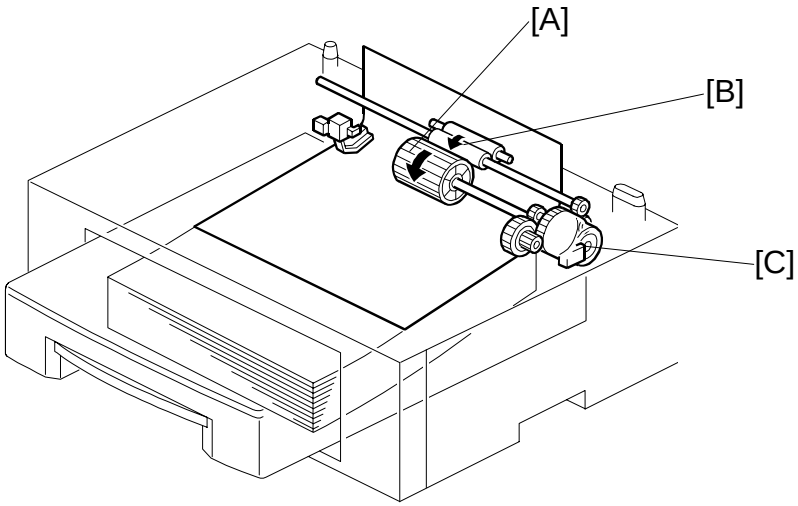


H547D522.WMF

The paper feed motor [A] drives the paper feed mechanism. When using the standard cassette, the paper feed motor turns clockwise, driving the paper feed roller [B], as shown in the diagram.

The clutch [C] only allows the paper feed roller to turn once for each sheet of paper.

Optional Paper Feed Unit

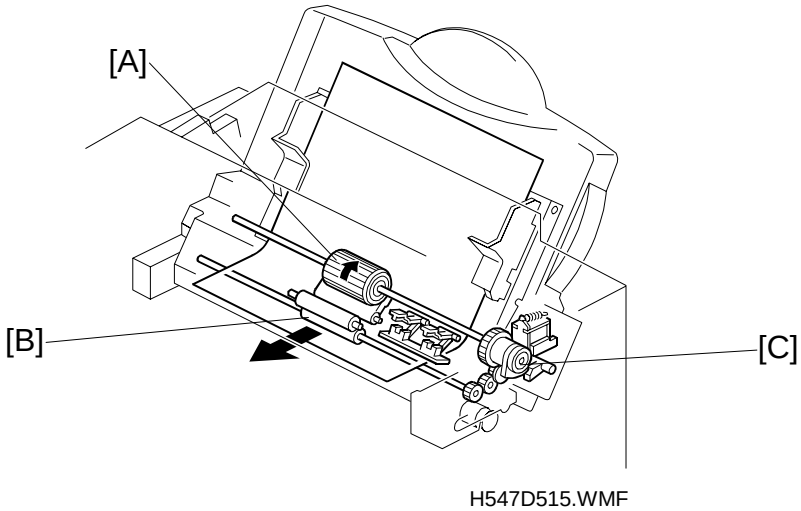


H547D508.WMF

The paper feed motor in the mainframe drives the paper feed mechanism through a gear train. When the optional paper feed unit is used, the paper feed motor turns counter-clockwise, driving the paper feed roller [A] and the transport roller [B], as shown.

The paper feed clutch [C] in the optional paper feed unit ensures that the paper feed roller rotates only once for each sheet of paper.

Optional Multi-purpose Feeder



H547D515.WMF

The paper feed mechanism is driven from the paper feed motor in the mainframe through a gear train. When the machine feeds a sheet of paper from the multi-purpose unit, the paper feed motor in the mainframe turns counter-clockwise to drive the paper feed roller [A] and the transport roller [B] as shown in the diagram.

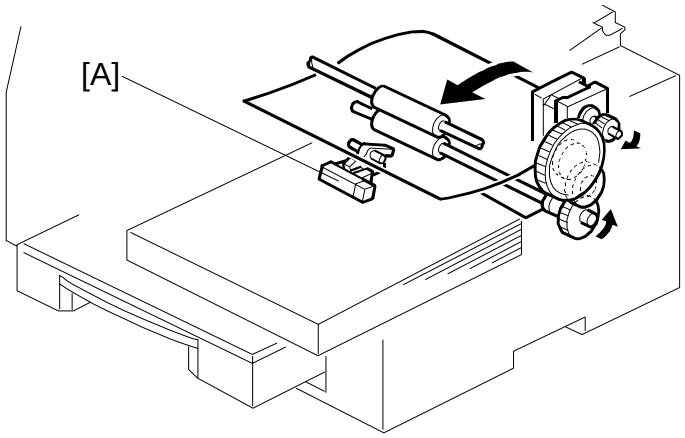
The paper feed solenoid operates the clutch [C] in the optional multi-purpose unit to ensure that the paper feed roller rotates only once for each sheet of paper.

Paper Feed Priority

If there is an optional paper feed unit and/or multi-purpose feeder installed in the machine, deciding paper feed priority is in accordance with the following rules:

- If the machine has an optional multi-purpose feeder and all of the cassettes contain paper of the same size, the machine uses the optional paper feed unit first, the standard cassette second, and the multi-purpose feeder third.
- The multi-purpose feeder can be set to print only from a PC by a user parameter switch adjustment.

2.2.8 REGISTRATION



H547D523.WMF

When the paper edge sensor [A] turns on, the machine slows the paper feed motor.

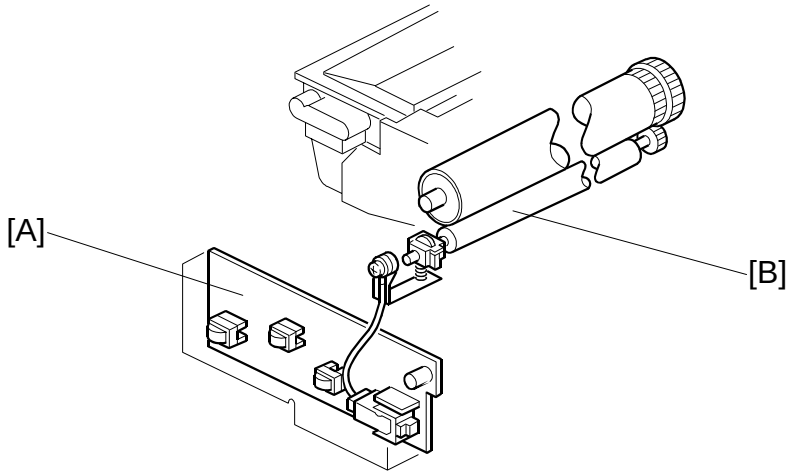
Then, a certain time after the paper's leading edge turns on the registration sensor, the machine starts to write the latent image to the drum.

When the paper edge sensor turns off, the machine speeds up the paper feed motor to feed the next page and stops the laser.

Jam Detection

	Condition	Error Code
Standard Cassette	When the paper edge sensor does not turn on within 2.6 seconds of the paper jam timing signal.	9-07
	When the registration sensor is not turned on within 5.5 seconds after the paper edge sensor turns on. When the paper edge sensor does not turn off within 9.47 seconds after the registration sensor turns on.	9-84
Any Paper Feed Station	When the fusing exit sensor does not turn on within 5.0 seconds after the registration sensor turns on	9-08
	When the registration sensor does not turn off within 4.8 seconds after the paper edge sensor turned off. When the fusing exit sensor does not turn off within 5.0 seconds after the registration sensor turns off.	9-09
Optional Paper Feed Unit	When the paper edge sensor does not turn on within 2.6 seconds after the paper feed clutch turns on.	9-50
	When the registration sensor does not turn on within 5.5 seconds after the paper edge sensor turns on. When the paper edge sensor does not turn off within 9.47 seconds after the registration sensor turns on.	9-51
Optional Multi-purpose Feeder	When the paper edge sensor does not turn on within 2.6 seconds after the paper feed clutch turns on.	9-82
	When the registration sensor does not turn on within 5.5 seconds after the paper edge sensor turns on. When the paper edge sensor does not turn off within 9.47 seconds after the registration sensor turns on.	9-83

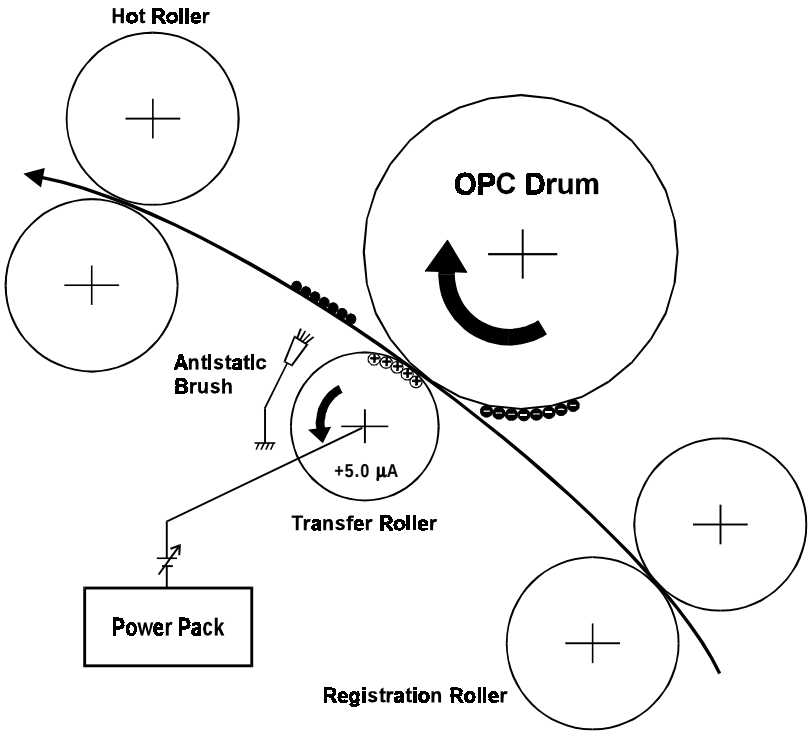
2.2.9 TRANSFER AND SEPARATION



H547D526.WMF

Instead of using a transfer corona wire, this machine uses a transfer roller, which touches the drum surface.

The power pack [A] applies a constant current of +5.0 μA to the transfer roller [B]. The positively biased transfer roller pulls negatively charged toner off the drum. The curvature of the drum and the anti-static brush help the paper to drop away from the drum.



H547D536.WMF

Cleaning Mode

If the paper is smaller than the printed image, or if a paper jam occurs during printing, toner may transfer to the roller surface. To prevent this from occurring, the transfer roller is cleaned before the next printing run.

While the machine is cleaning the transfer roller, the power pack supplies -1200V to the transfer roller, and charges the drum to -750V. The negatively charged toner on the transfer roller transfers back to the drum.

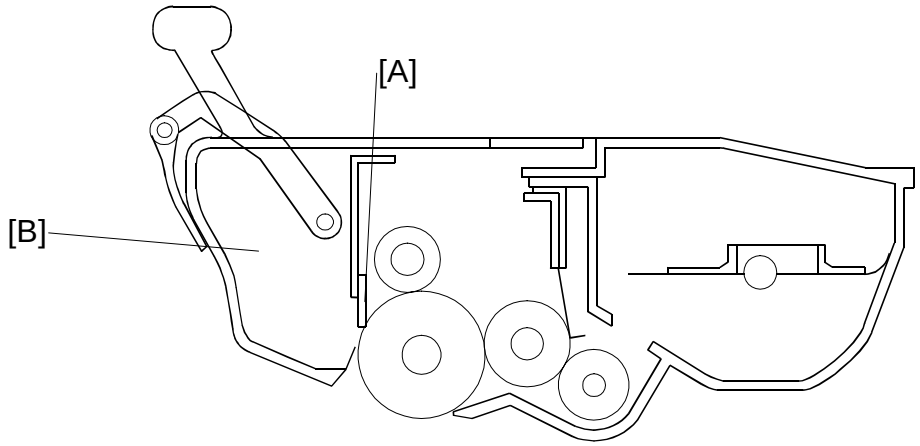
The machine cleans the transfer roller under the following conditions:

- At power on (when the fusing temperature reaches half of the standby temperature).
- When the cover is opened and then closed during the printing process.
- After clearing a printer jam.

The CPU controls the transfer roller voltage through the power pack using the following signals.

In	THTRG	On	Off	On	Off
	TLPWM	Off	On	On	Off
Out	Transfer Roller	+ 5.0 μA	- 1200 V	-	Off

2.2.10 CLEANING



H547D519.WMF

The cartridge contains the cleaning unit and the used toner tank.

The cleaning blade [A] removes any toner remaining on the drum after the image is transferred to the paper, and then brings the toner into the used toner tank [B].

There is no used toner overflow detection mechanism because the used toner tank is large enough for the lifetime of the cartridge.

2.2.11 FUSING

Fusing Lamp Control

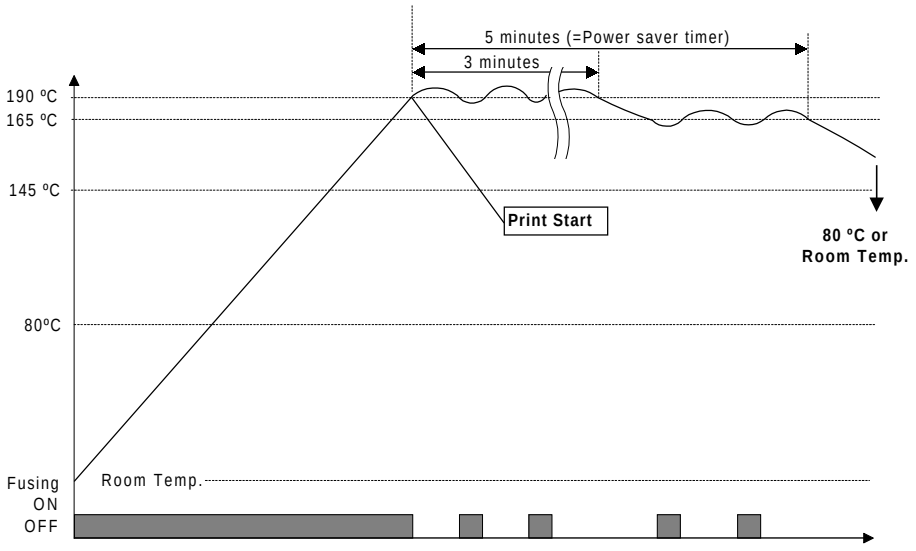
During printing, the machine keeps the fusing temperature at 190°C. If the printing operation continues for more than 3 minutes, the machine keeps the fusing temperature at 165°C.

When the Energy Saver Key is pressed or the energy saver timer expires, the machine goes into an energy saver mode. In Level 2 Energy Saver Mode (2-watt Energy Saver Mode), the fusing lamp shuts off. For Energy Saver Mode Level 1, the user can select whether to keep the fusing lamp off or at 80°C.

Cross Reference
Energy Saver Modes: Section 2-3

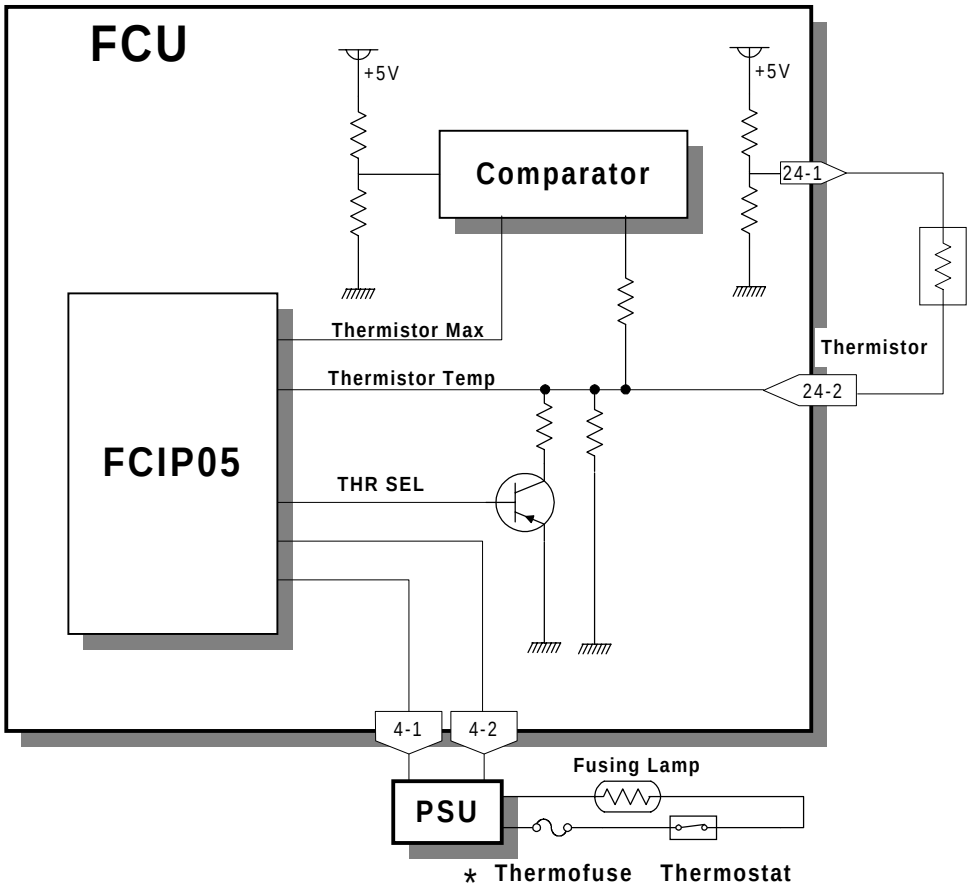
Points to Note:

- Standby temperature: Room temperature (2 watt-Energy Saver Mode), 80 °C if users select 'Fusing Lamp On'
- Printing temperature: 190 °C, falling back to 165 °C after 3 minutes
  If the initial lamp temperature is over 120 °C before printing, the printing temperature is 165 °C.
- Thermistor maximum: 250 °C (monitored by a comparator)
- Thermostat maximum: 150 °C (the temperature of the hot roller would be about 400 °C)
- Thermofuse maximum: 169 °C (the temperature of the hot roller would be about 400 °C) - The thermofuse is not used in USA models.



H547D538.WMF

Fusing Control



H547D662.WMF

There is no thermofuse in USA and Asia models.

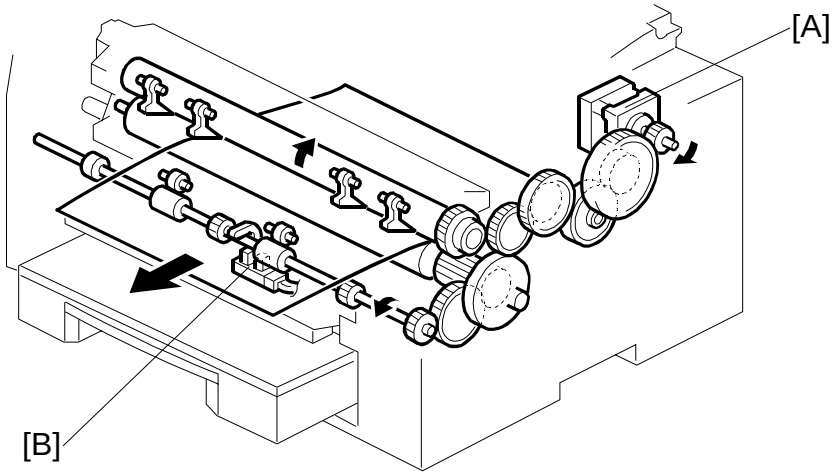
During normal operation, the CPU controls the fusing lamp based on input from the thermistor using the above circuit.

When the machine is turned on, or when it comes back from the Level 2 Energy Saver Mode, it checks whether the thermistor circuit is intact by using the THR SEL signal on the FCU. If the thermistor is connected properly, the machine begins normal operation. If it is not, it generates an Auto Service Call (error code 9-22, sub-code 09).

As a backup safety measure, when the temperature of the hot roller reaches approximately 400 °C, the thermostat and/or thermofuse open.

The machine turns on the cooling fan when the fusing temperature reaches 60°C and shuts it off when the fusing temperature drops below 60°C.

Fusing Unit Drive



H547D524.WMF

The main motor [A] drives the fusing unit through a gear train. The fusing exit sensor [B] detects when the paper is fed out of the unit.

After opening the upper unit, the gear train frees up making it easy to remove jammed paper.

Jam Detection - Paper Feed Out

The machine detects a paper jam when the fusing exit sensor does not turn off within 5.0 seconds after the registration sensor turns off (Error Code 9-09).

This is the same for all cassettes.

Fusing Unit Service Call Conditions

	Conditions	Error Code (9-22)
At power on	If there is a problem with the thermistor. (Also for when the machine returns to Normal Mode from Energy Saver Mode Level 2.)	Sub-code 09
	If the machine detects that both jumper 63 and jumper 64 are shorted. *[The status of the jumpers determines the model type. (USA, Europe/Asia, Japan)]	Sub-code 0B
Standby mode	If the fusing temperature stays below 70 °C for more than 36 seconds after selecting fusing lamp ON in Energy Saver Mode Level 1 or when in Standby Mode.	Sub-code 05
	If the fusing temperature takes more than 60 seconds to reach 145°C from the standby temperature.	Sub-code 02
	Either: If the fusing temperature stays above 110°C for more than 180 seconds after selecting the power saver standby temperature of 80°C for Energy Saver Mode Level 1. Or: If the fusing temperature stays above 175°C for more than 180 seconds after selecting the power saver standby temperature of 145°C for Energy Saver Mode Level 1.	Sub-code 0A
During printing	If the fusing temperature is above 190°C for more than 180 seconds.	Sub-code 01
	If the fusing temperature is below 150 °C for more than 180 seconds.	Sub-code 06
	If the fusing temperature is below 140 °C for more than 1 second.	Sub-code 07
After printing	If the fusing temperature takes more than 20 minutes to return to 100°C when the machine goes into Energy Saver Mode Level 2. (After selecting fusing lamp Off for Energy Saver Mode Level 2.)	Sub-code 03
	Either: If the fusing temperature takes more than 20 minutes to go down to below 100 °C when the machine goes into the Energy Saver Mode Level 2. (After selecting the standby temperature of 80 °C for Energy Saver Mode Level 2.) Or: If the fusing temperature takes more than 5 minutes to go down to 165 °C after selecting the standby temperature for Energy Saver Mode Level 1.	Sub-code 04
At any time	If the fusing temperature reaches 250°C.	Sub-code 08

2.3 SYSTEM FEATURES

2.3.1 ENERGY SAVER MODES

In normal mode (during operation) or energy saver mode level 1, the main CPU monitors and controls the machine. The fusing lamp is either turned off or maintained at the standby temperature (80 °C), depending on the User Parameter Switch 05 bit 6 setting.

In Energy Saver Mode, level 2 (also known as the 2-watt Energy Saver Mode), the main CPU and DC power supplies are shut down. The Energy Saver CPU monitors the Energy Saver key, incoming calls, the document sensor, and the PC interface. When the Energy Saver CPU detects activity at one of these, it activates the +5V supply to start up the main CPU and other power supplies.

	Normal	Level 1	Level 2
Main CPU	ON	ON	OFF
Energy Saver CPU	OFF	OFF	ON
LCD/LED	ON	OFF	OFF
Energy Saver LED	OFF	ON	ON
+5V Power Supply	ON	ON	OFF
+24VM Power Supply	ON	ON	OFF
Fusing Lamp	ON	80 °C or OFF	OFF

The fusing lamp is turned off as the default setting for energy saver mode level 1.

When the energy saver timer expires, the machine automatically goes into Energy Saver Mode level 1 to keep the cooling fan going. When the fusing temperature has fallen down below a certain threshold, the machine enters Energy Saver Mode level 2.

Cross Reference
Energy saver timer initial setting: System Switch 0B, Bits 2 and 3
(1 minute, 3 minutes, 5 minutes, or Unlimited: Timer disabled)

Going to Level 2 Mode from Level 1 Mode

The machine will not go into Level 2 Energy Saver Mode if one of the following conditions exists:

- Either a TX/RX file is stored in the memory.
- SAF memory not empty
- Mechanical error(s)
- The NCU is off-hook

Manual Wake Up Conditions

While the machine is in Energy Saver Mode, either the Energy Saver CPU (Level 2) or the main CPU (Level 1) monitors signals from the following:

- Energy Saver key
- Document sensor
- Off-hook detector on the NCU
- Activation signal from the G4 unit

When the CPU detects a signal from one of these, it wakes up all the components and the machine enters normal operating mode, even during the Night Timer period.

After the operations are done, the machine returns to Energy Saver Mode, as explained previously.

NOTE: The machine does not detect cover open during the level 2 Energy Saver Mode.

2.3.2 AUTOMATIC SERVICE CALLS

Service Call Conditions

The machine makes an automatic service call when one of the following conditions occurs.

Service Call Conditions	Error Code	Sub-code 8004B1(H)
Laser diode failure	9-20	21
Fusing lamp failure	9-22	01 to 0B
Polygon mirror motor failure	9-23	31 or 32
Power pack failure	9-29	51 to 59
Excessive jams in the scanner	None	None
Excessive jams in the printer	None	None
The PM counter has reached the threshold (60,000 prints)	None	None
The PM interval has expired	None	None

Cross Reference
Service station number: Service Function 13
Troubleshooting: Chapter 7

2.3.3 SEP/SUB CODING

Overview

ITU-T introduced the following protocol signals in the T.30 recommendation in 1996. These signals enable confidential transmission and secured polling between machines produced by different manufacturers.

SEP (Selective Polling): This signal informs the other terminal of the polling ID to enable secured (ID) polling.
Up to 20 digits or characters can be sent in a SEP frame.

PWD (Password): This signal informs the other terminal of the password to enable extra security.
Up to 20 digits or characters can be sent in a PWD frame.

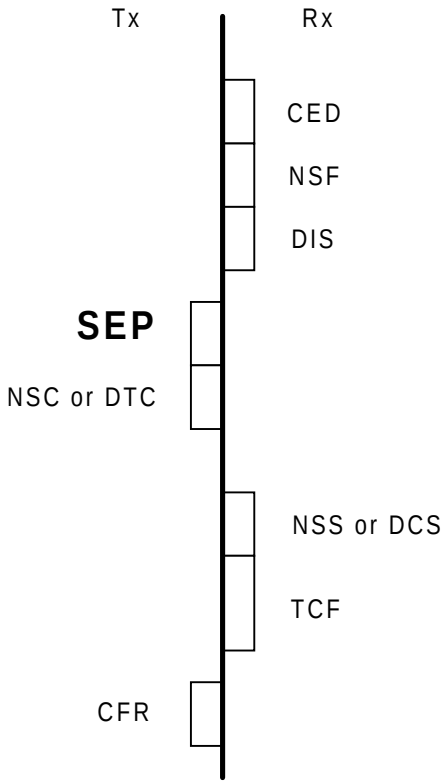
SUB (Sub-address): This signal informs a sub-address of a destination. Some fax servers use this information to route a received fax message to a specific address in the local network.
Up to 20 digits or characters can be sent in a SUB frame.

SID (Sender ID): This signal informs the other terminal of the sender ID to identify the transmitter.
Up to 20 digits or characters can be sent in a SID frame.

The ITU-T recommendation only clarifies the requirements for the transmitting terminal, and does not specify the requirements for the receiving terminal. How the receiving terminal treats these signals varies with receiver terminal and manufacturer.

NOTE: This machine is not capable of receiving above (SEP/PWD/SUB/SID) signals.

Selective Polling (SEP/PWD)



H547D560.WMF

SEP Signal:
When the RX terminal receives the SEP signal with the NSC or DTC signal, the RX terminal switches over to secured polling transmission using the SEP ID. The SEP (Selective polling) signal must contain four digits as an ID.

The RX terminal automatically disconnects the line when any of the following conditions occur (Error Code 0-15):

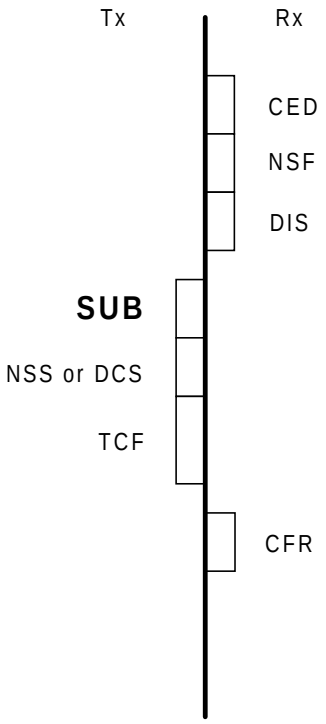
- When the SEP ID is other than four digits
- When anything other than numbers is included in the ID

The communication is free polling when the programmed SEP ID is 0000.

PWD Signal:
When the PWD (password) and the SEP signals are transmitted together, the PWD programmed becomes an ID code for the stored ID override.

NOTE: PWD reception is disabled for this machine.
The machine automatically disconnects the line when it receives the PWD signal.

Sub-address (SUB/SID)



H547D561.WMF

SUB Signal:
The SUB (sub-address) signal transmitted from the TX terminal contains a confidential ID. A stored message can be printed using the SUB ID as a confidential ID.

The SUB ID must contain four digits. The receiving terminal automatically disconnects the line when any of the following conditions occur (error code 0-15):

- When the SUB ID is other than four digits
- When anything other than numbers is included in the ID
- When a confidential ID is not programmed in the RX terminal and when the transmitted SUB ID is 0000

A stored message can be printed using the (normal) confidential ID stored in the machine when the SUB ID sent from the transmitter is 0000.

SID Signal:
When transmitted together with the SUB signal, the SID programmed is an ID code for the confidential ID stored override.

NOTE: SID reception is disabled for this machine.
This machine automatically disconnects the line when it receives a SID signal.

Cross-reference: Section 4.2 Bit Switches
Communication Bit Switch 17 Bit 1: SUB signal reception.

2.3.4 PAGE SEPARATION AND DATA REDUCTION

Incoming pages that are only slightly longer than the copy paper may be reduced in the sub-scan direction. Whether or not this happens depends on the settings of printer switches 04 and 05.

Reduction Enabled

If bit 0 of printer switch 03 is at 1 (Enabled), the data will be reduced in the page memory to fit on the copy paper. However, data will only be reduced if the length of the incoming page is ± 5 mm shorter than a certain maximum length. The maximum reducible incoming page length depends on the copy paper size and the reduction ratio stored for that paper size in printer switches 04 and 05.

Each paper size can be programmed with a separate reduction ratio. In each of the two bit switches, there is one bit for each possible paper size. The combination of the bit settings determines the ratio for that paper size.

Bit No.	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Switch No.	Not used	Not used	Legal	F4	A4	Letter	Not used	A5 sideways
Sw 04	0: 4/3		1: 4/3		0: 8/7		1: 12/11	
Sw 05	0:		0:		1:		1:	

The following table shows the maximum reducible incoming page length for each copy paper size. All lengths are in millimeters. The factory setting of the reduction ratio is 4/3.

Paper Type	Printable Page Length	Maximum Reducible Incoming Page Length		
		Ratio = 4/3	Ratio = 8/7	Ratio = 12/11
A5 Sideways	147.8 mm	190.1 mm	162.9 mm	155.3 mm
Letter	279.2 mm	365.2 mm	313.0 mm	298.7 mm
A4	296.9 mm	388.8 mm	333.2 mm	318.2 mm
F4	330.1 mm	402.0 mm	371.2 mm	354.3 mm
Legal	355.6 mm	402.0 mm	400.3 mm	382.1 mm

Incoming pages that are longer than the maximum length will not be reduced, but will print on two pages and be treated in accordance with the setting of bit 1 of printer switch 00. If this bit is 1, the bottom few lines of the page will continue from where the first page left off. If it is 0, the next page continues from where the previous page left off.

Reduction Disabled

If bit 0 of printer switch 03 is at 0 (Disabled), the data will not be reduced. In addition, if the incoming page is up to x mm longer than the copy paper, the excess portion will not print. The setting of bits 4 to 7 of printer switch 03 determine the value of x, somewhere between 0 to 15 mm.

Hex value	Value of X
0	0
0	1
and so on until	
F	15

Messages more than x mm longer than the copy paper will print out on two pages in accordance with the setting of bit 1 of printer switch 00, as explained earlier.

2.3.5 MEMORY RECEPTION CONDITIONS

User parameter switch 05 bit 1 allows the user to select how to treat an incoming message that is without RTI or CSI.

User parameter switch 05 Bit-1:
Memory reception if no RTI or CSI received 0: Possible, 1: Impossible

If 0 is selected, the machine receives all messages regardless of RTI and CSI.

If 1 is selected (this is the default setting), the user parameter setting works in combination with the following bit switch.
System Bit Switch 11 Bit 6:

Conditions for memory reception if no RTI or CSI is received.
0: Impossible; memory reception is available only after receiving the RTI or CSI.
1: Memory reception is possible if there is no mechanical (printer) error.

The default setting is 1. The default setting means that if the printer is working, it will receive all messages. However, when there is a mechanical error in the printer, the machine rejects such a message because no trace of the sender will be stored in the machine.

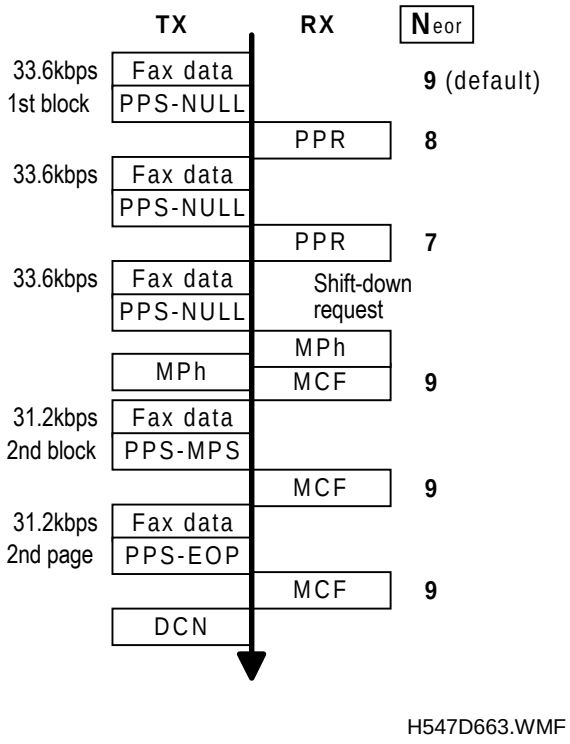
2.3.6 V.8/V.34 PROTOCOL

Please refer to the V.8/V.34 Training Manual for overall information about V.8/V.34 protocol.
This section explains only functions that are specific to this machine.

NOTE:

Data Rate Change Procedure

Shift-down Request from Receiving Terminal

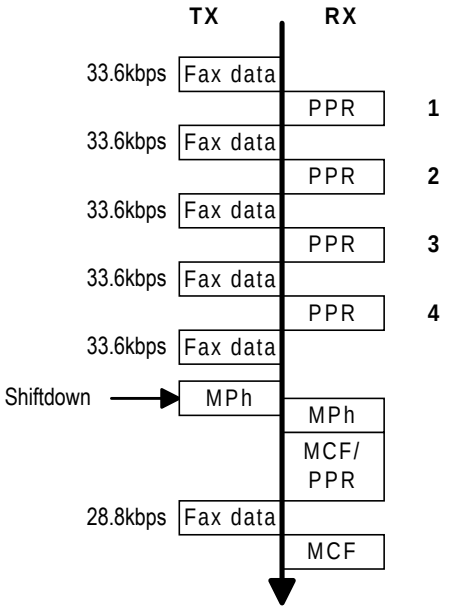


H547D663.WMF

- Neor is the number of frame re-transmissions until the TX terminal sends DCN to terminate the communication. This number is fixed at “9”, and is not adjustable.

If this machine has sent two PPRs for one ECM block, it will request one step shift-down to the sender terminal in the next control channel.

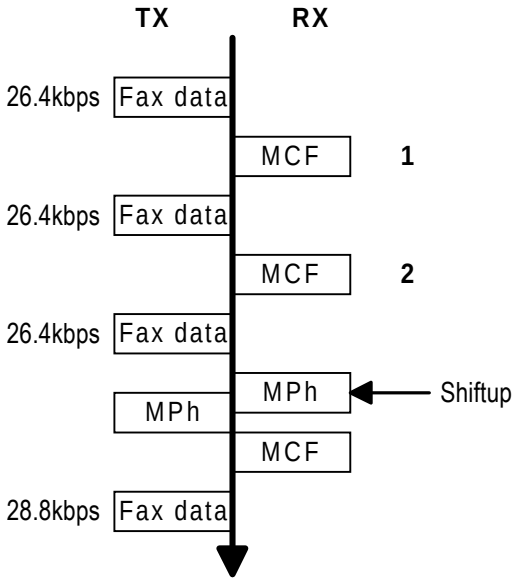
Shift-down Request from Sending Terminal



H547D563.WMF

If this machine has received four PPRs for one ECM block, it will request a two-step shift-down to the receiving terminal in the next control channel.

Shift-up Request from Receiving Terminal



H547D564.WMF

If this machine has sent two consecutive MCFs and detected a good line condition, it will request a one step up-shift to the sender terminal in the next control channel.

2.3.7 BLANK SHEET DETECTION

When the machine scans the document for transmission, it counts the black pixels. If the number of black pixels is below a certain threshold, the machine displays an error message (BLANK DOCUMENT).

Immediate transmission

When the machine detects one or more blank pages, the LCD displays an error message for 20 seconds after transmission.

Memory transmission

When the machine detects one or more blank pages, the LCD displays an error message for 20 seconds after completing memory storage.

Cross Reference
Section 4.5 Service RAM Address

800858 Error display condition

The setting of this RAM address determines when the machine displays the “blank paper detected” error message.

01H: If the first page is blank (default setting)

02H: If all the pages are blank

03H: If at least one of the pages is blank

2.3.8 PARALLEL MEMORY TRANSMISSION

Using memory transmission, the machine starts dialing after the document has been completely scanned. Using Parallel Memory Transmission, the machine starts dialing at the same time the machine starts scanning. If the document has multiple pages, the machine scans them into memory and sends at the same time.

The following table shows the differences between normal memory transmission and parallel memory transmission.

	Memory Tx	Parallel Memory Tx
File Reserve Report	Printed, if automatic report printout is enabled	Not printed.
If the other terminal is busy	Resends the message later.	Continues scanning the document into memory and tries to resend later.
If transmission failed	Resends the remaining pages later.	Resends the remaining pages later.
If memory overflows during scanning	Stops scanning and erases all the scanned pages from the memory, if the user agrees to erase them.	Stops scanning and hangs up the communication when the memory overflow is detected. Then erases all the scanned pages from the memory without notice.
If a document jam occurred during scanning	Stops scanning and erases all the scanned pages from the memory.	Stops scanning and hangs up the communication when a document jam is detected.
How and when the scanned message is erased from the memory.	The complete message is erased after all the pages have been sent.	The complete message is erased after all the pages have been sent.
Meaning of the stamp mark	Successfully scanned.	Successfully scanned.
Total page numbering (P. x/x)	Enabled	Not available unless the number of pages is programmed manually.

In the following cases, the machine uses normal memory transmission even if parallel memory transmission is enabled.

- Send later
- Broadcasting
- Transmission of an Auto Document only
- Transfer request
- If the other terminal is busy
- When remaining memory space is less than the threshold (default setting: 256 kB)

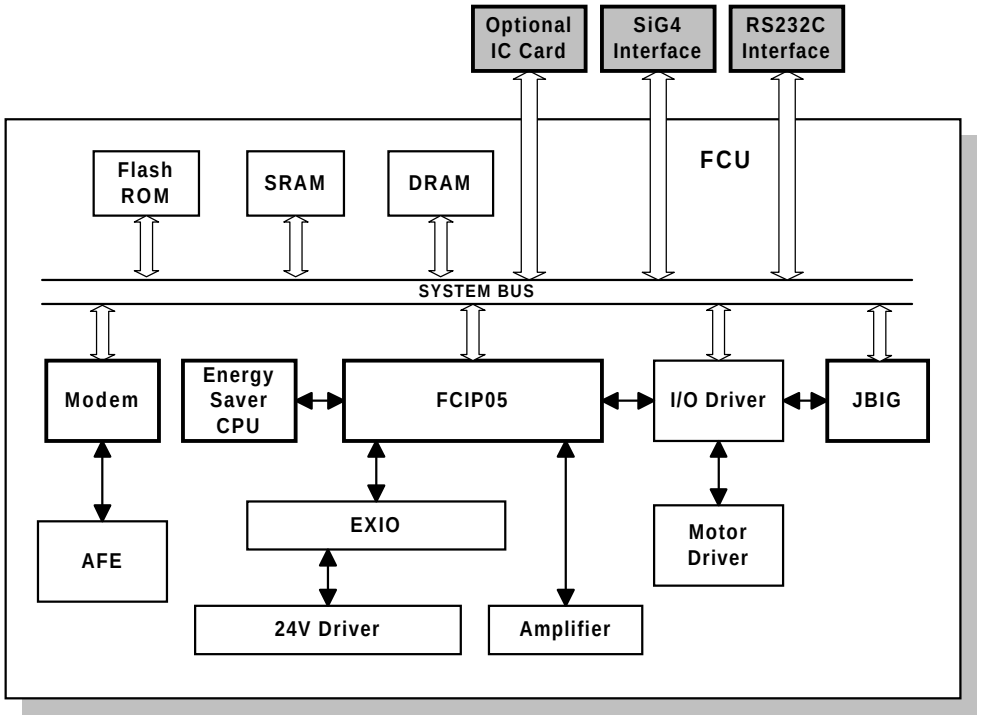
Using G4 transmission, parallel memory transmission is normally disabled because the transmission speed is much faster than the scanning speed.
However, if the document contains pages with complicated images or when sending a photo document using halftone, using parallel memory transmission may be faster than normal memory transmission.
If the user commonly sends this type of fax messages, enable parallel memory transmission for G4 transmission by changing system bit switch 11, bit7 to “1.”

Cross Reference

Parallel memory Tx (G3) On/Off:	User parameter 07, bit2
Parallel memory Tx (G4) On/Off:	System switch 11, bit7
Memory threshold for enabling parallel memory Tx:	System switch 10

2.4 PCBS

2.4.1 FCU



H547D541.WMF

The FCU (Facsimile Control Unit) board contains the FCIP05 (Facsimile Control and Image Processor), DRAM, SRAM, Flash ROM, and video processing memory, and it controls the entire system.

FCIP05

- CPU
- Data compression and reconstruction (DCR) for fax mode and some PC Fax Class 2 applications
- Digital image processor
- Laser interface
- DMA controller
- Clock generation
- Stepper motor control
- DRAM backup control
- Fusing lamp control

ROM

- 2MB (16 Mbits) flash ROM for system software storage

DRAM

- 2 MB DRAM shared between the Line Buffer (96 KB), ECM Buffer (128 KB), Page Memory (672 KB), System RAM (128KB), SAF memory (960 KB), and Working DRAM

SRAM

- 128 KB SRAM for system and user parameter storage, backed up by the battery on the FCU

Modem (Rockwell R288F)

- V.21, V.27ter, V.29, V.17, V.33 (Ricoh mode only), and V.34 modems

Energy Saver CPU

- 4-bit CPU for controlling the machine during energy saver mode.

I/O Driver

- Power pack and main motor control
- Parallel to serial conversion of motor control signals
- Parallel to serial conversion of JBIG data (only in the USA model)

JBIG LSI

- JBIG Compression LSI (installed only in the USA model)

Oscillators

- OSC1: 32.768 KHz oscillator for the real time clock. The battery on the FCU backs this up
- OSC2: 29.952 MHz oscillator for system, scanner and printer clock generation
- OSC3: 28.224 MHz oscillator for the R288F modem clock
- OSC4: 16 MHz oscillator for the I/O Driver and JBIG LSI clock
- OSC5: 8.00 MHz oscillator for the Energy Saver CPU clock

EXIO (Expand I/O)

- Serial interface to the operation panel and optional paper feed units
- Parallel interface to the motors, clutches, sensors, and other electrical components

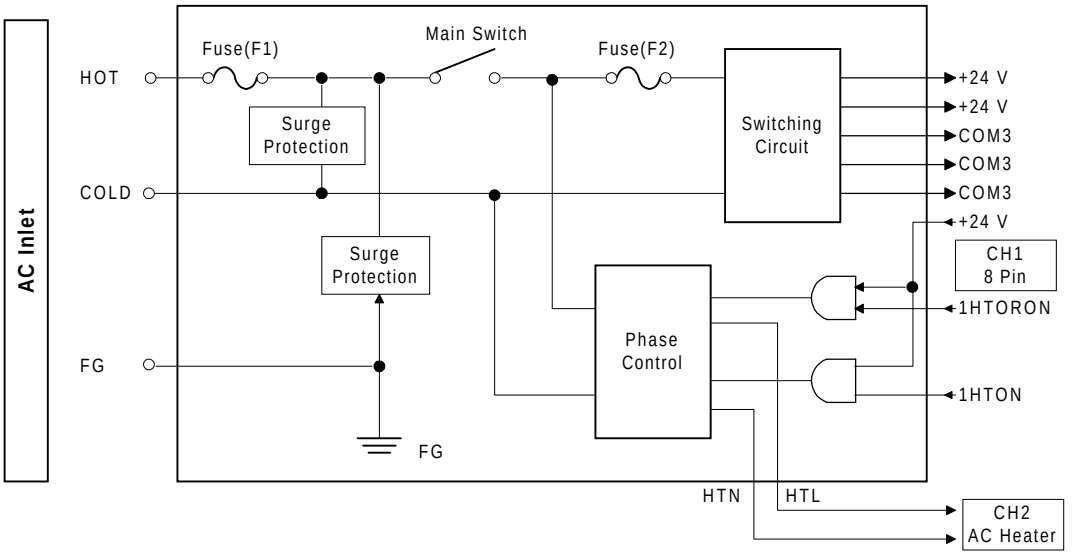
Switch

Item	Description
SW1	Switches the backup battery on/off

Analog circuit with HIC (AFE - Analog Front End)

- 2-4 wire switching
- Filters and amplifiers
- Monitor speaker driver

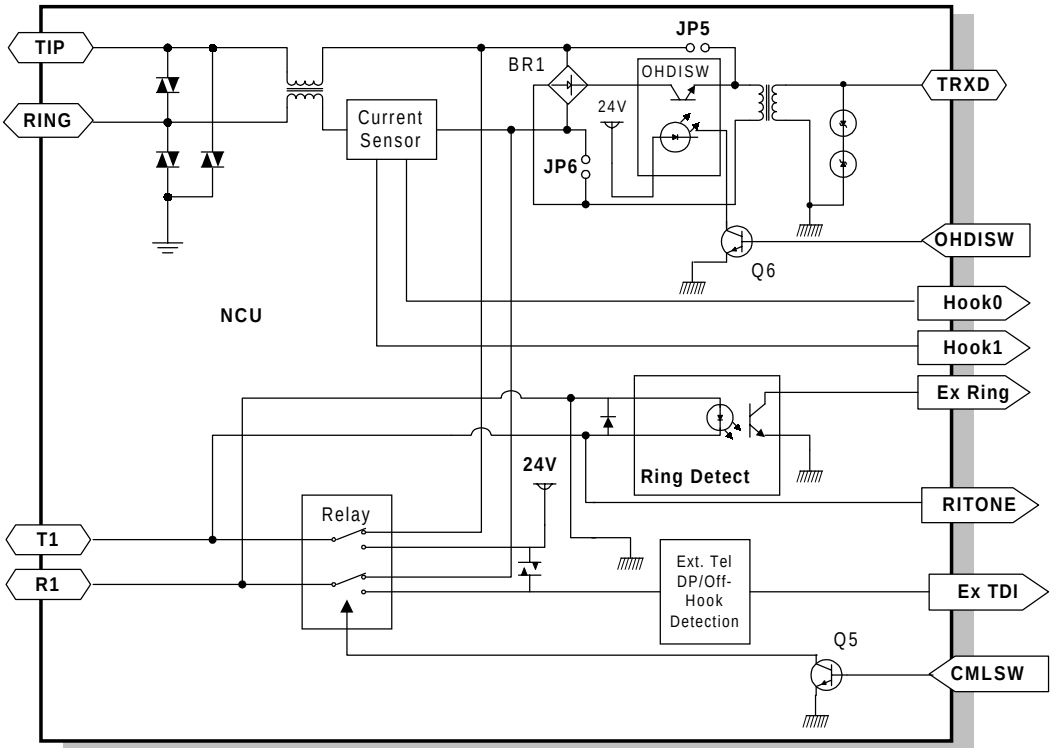
2.4.2 PSU



H547D501.WMF

- +24Vdc generation
- Fusing lamp AC power supply and control

2.4.3 NCU (USA)

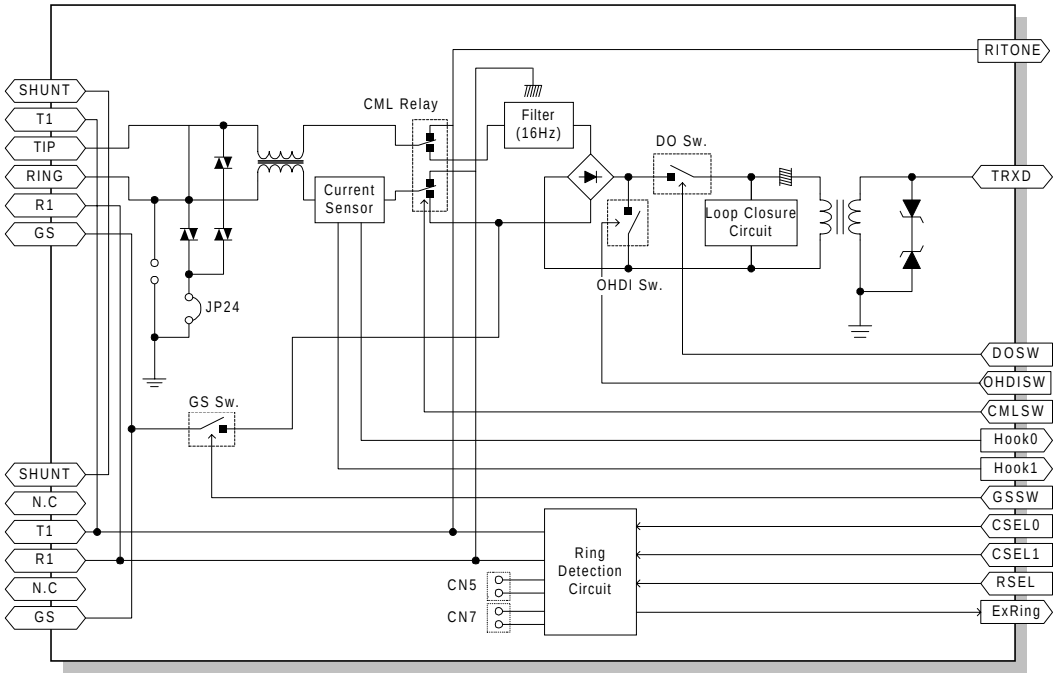


H547D550.WMF

Jumpers

Item	Description
JP5	These jumpers should be shorted when the machine is connected to a dry line for back-to-back tests.
JP6	
BR1	Also remove BR1 when the machine is connected to a dry line.

2.4.4 NCU (EUROPE/ASIA)



H547D551.WMF

Control Signals and Jumpers

Country	CSEL0 CN2-4	CSEL1 CN2-5	RSEL CN1-13	JP24	CN5	CN7
Austria, Denmark, Spain, UK, Turkey, Sweden, New Zealand, Singapore, Hong Kong, Finland	L	L	L	S	O	O
Malaysia	H	L	L	S	O	O
France, Norway, Holland, USA, Asia, Australia, China, Taiwan	L	L	H	S	O	O
Belgium, Germany, Switzerland, Portugal, Israel	L	H	H	S	O	O
Ireland, South Africa, Italy, Greece	H	L	H	S	S	S
	L: Low, H: High			**S: Short, 0: Open**		

3. INSTALLATION

3.1 INSTALLING THE MACHINE

Refer to the Operator's Manual for information about the installation environment and instructions on how to install and set up the machine.

Refer to section 2.4. for how to set up the NCU hardware in each country.

3.2 INITIAL PROGRAMMING

Items to Program (Service Level)	Function No.
Country code (NCU parameter 00)	Function 08
Country code (System switch 0F)	Function 01
Protocol requirements (G3 switch 0B)	Function 01
Machine's serial number	Function 14
Service station's fax number	Function 13
PM call (System switch 01- bit 0)	Function 01
Periodic service call (RAM address 80036B)	Function 06

Items to Program (User Administrator Level)	Function No.
Clock	Function 91
Initial programming items	Function 61
On/off switches	Function 62
Display/report language	Function 93
Fusing power control during energy saver mode (User parameter switch 05 - bit 6)	Function 63
PSTN access code (Also in RAM address 8000BB)	Function 61
PABX access method (User parameter switch 13 - bit 0, 1. (Also in RAM address 8000AD)	Function 63

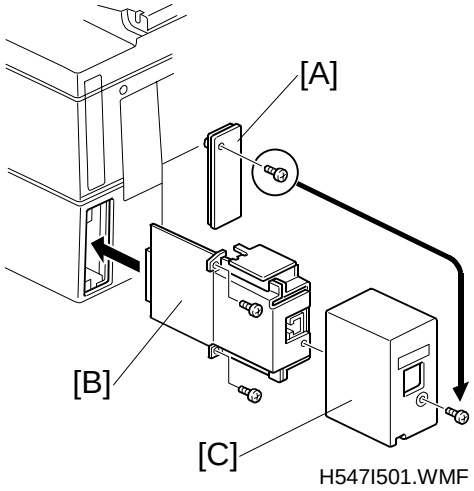
3.3 INSTALLALING OPTIONAL UNITS

⚠CAUTION
Do the following before installing an optional unit: 1. Print out all messages stored in the memory. 2. Print out the lists of user-programmed items and the system parameter list. 3. Turn off the main switch, and disconnect the power plug.

NOTE: Refer to the Operator's Manual for the user installable options.

3.3.1 ISDN G4 UNIT

Installation Procedure



H547I501.WMF

1. Remove the G4 cover [A] (1 screw).
2. Insert the ISDN board [B] firmly into the slot and secure the board (2 screws).
3. Attach the G4 unit cover [C] with the screw which was removed in step 1.
4. Connect the ISDN cable. Plug in the power cord and turn on the main switch.
   NOTE: Connect the ISDN cable so that the core is closer to the machine.
5. Set Communication Bit Switch 16 bit 2 to "1." Then turn the machine off and on to enable the ISDN unit.
   Print the system parameter list and make sure that "SIG4" is listed as an option on the list.
6. Input the initial settings with user function 61, 64, and service function 16. Please refer to the ISDN option service manual for details.
   Make the following settings if necessary.
   - System bit switch 0A bit 1: Default communication mode
     Bit 1 0: G3 1: G4
   - System bit switch 0A bit 6: Line used for G3 transmission (not required for the I-Schmidt 3)
     Bit 6 0: PSTN 1: ISDN
   - System bit switch 0A bit 7: Line used when the machine falls back to G3 from G4 (not required for the I-Schmidt 3)
     Bit 7 0: PSTN 1: ISDN

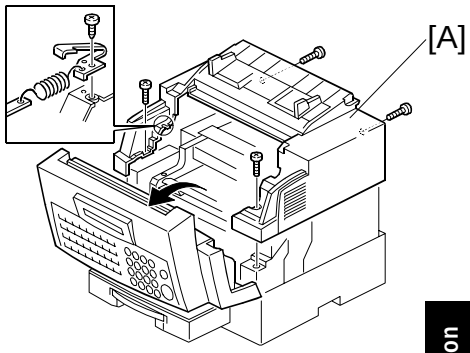
NOTE: Make sure that you input the following subscriber numbers when you connect the machine under the US National ISDN network.
- Subscriber number: G4 Subscriber No.1 (Main)/ G3 Subscriber No.1 (Main)
- SPID Number: G4 Subscriber No.2 (Sub)/ G3 Subscriber No.2 (Sub)

End of Procedure

3.3.2 COUNTER

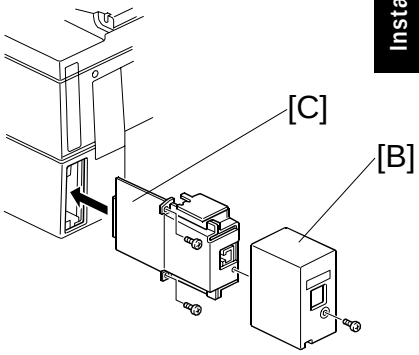
Installation Procedure

1. Remove the top cover [A] (4 screws, 1 screw with spring plate).
   NOTE: Be careful not to damage the bottom part of the top cover with the scanner cover after removing the spring plate.



H547R514.WMF

2. **This step is required only for the H548 models.**
   Remove the G4 unit cover [B] (1 screw) and the ISDN board [C] (2 screws).

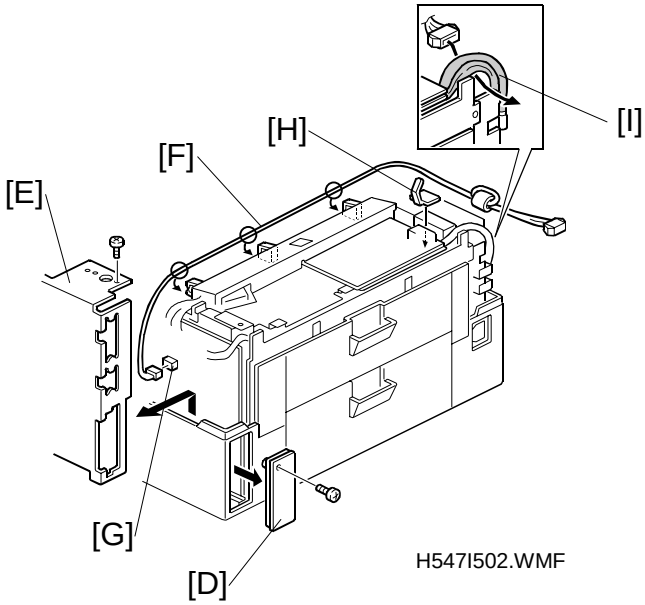


H547I508.WMF

3. Remove the G4 cover [D] (1 screw) and the FCU shield plate [E] (1 screw).

   Connect the counter harness [F] to the FCU [G] (CN48).
   Then secure the harness through harness holders as shown.

4. Attach the harness clamp [H] to the NCU bracket and secure the counter harness. Pass the counter harness underneath the PSU and NCU harnesses [I] as shown.
   Then replace the FCU shield plate and the G4 cover which were removed in step 3.



H547I502.WMF

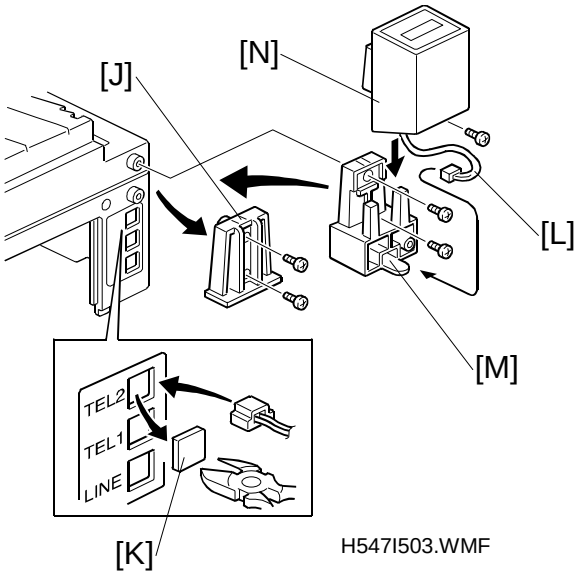
Installation

5. **This step is required only for the USA model.**
   Remove the handset bracket [J] from the top cover (2 screws).

6. Cut off the TEL2 cover [K].

7. Thread the harness [L] through the opening in the counter bracket [M] and the TEL2 cover opening. Then attach the counter unit to the top cover
   (USA models: use the screws that were removed in step 5).

8. Secure the mechanical counter [N] to the bracket (1 screw).

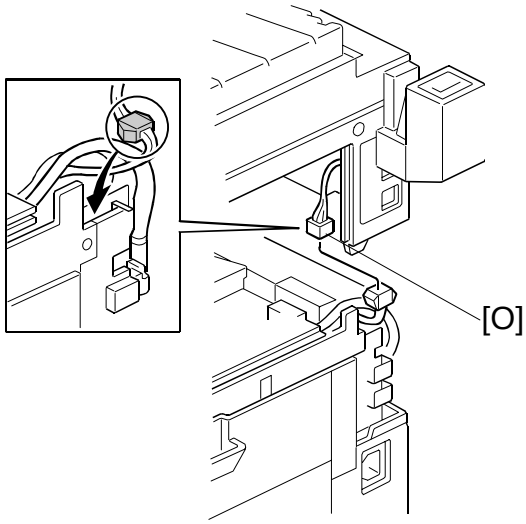


H547I503.WMF

9. Connect the counter harness [O] and place the connector into the recess under the PSU harness as shown.
   Then replace the top cover.

10. Plug in the machine and turn on the main switch. Make some copies and check whether the counter works.

End of Procedure

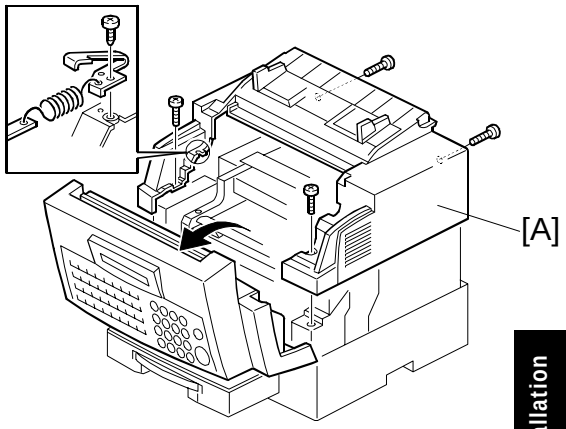


H547I504.WMF

3.3.3 PC FAX EXPANDER

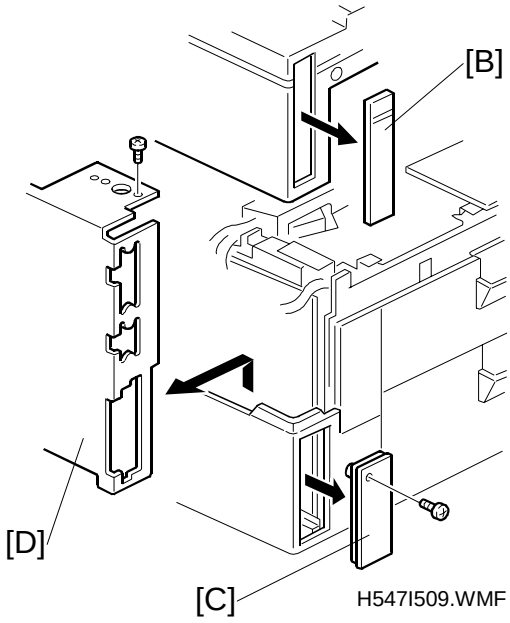
Installation Procedure

1. Remove the top cover [A] (4 screws, 1 screw with spring plate).
   NOTE: Be careful not to damage the bottom part of the top cover with the scanner cover after removing the spring plate.



H547R514.WMF

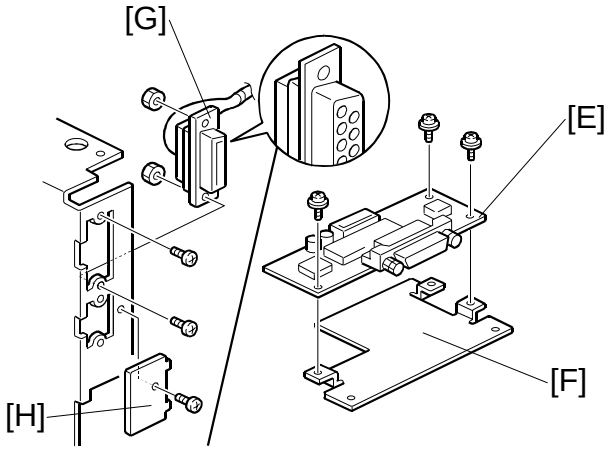
2. Remove the PCFE cover [B] and the G4 cover [C] (1 screw). Then remove the FCU shield plate [D] (1 screw).



H547I509.WMF

3. Secure the PCFE board [E] to the bracket [F]
   (3 screws).

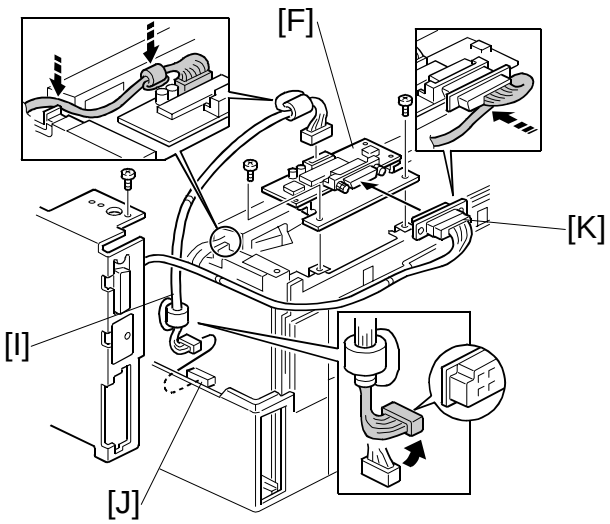
4. Attach the RS232C port [G] to the shield plate
   (2 screws, 2 hexagon nuts).
   Place the shield cover [H] to the shield plate.



H547I506.WMF

5. Attach the PCFE bracket [F] to the machine (2 screws).

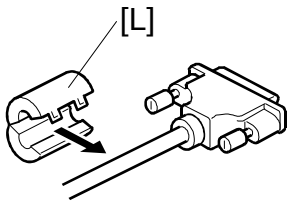
6. Connect the PCFE harness [I] to the FCU [J] (CN2) and the PCFE board (CN2).
   Route the harness as shown.
   NOTE: Bend the PCFE harness prior to connecting to the FCU as shown.



H547I507.WMF

7. Connect the RS232C harness [K] to the PCFE board (CN1).
   Bend the cable under the connector as shown.

8. Replace the FCU shield plate, G4 cover and the top cover.



H547I512.WMF

9. Attach the core [L] to the RS232C cable.
   Connect the PC-Fax Expander port with the PC port using the RS232C cable.
   Plug in the machine and turn on the main switch.
   Set System bit switch 06 bit 5 to “1.” Then turn the main switch off and on to enable the PC-Fax Expander.
   Print the system parameter list and make sure that “PC-Fax Expander” is listed as an option on the list.

End of Procedure

4. SERVICE TABLES AND PROCEDURES

4.1 SERVICE LEVEL FUNCTIONS

In this section, the following symbols refer to frequently used keys:
- Start key
- Stop key
- [Function] - Function key
- [Yes] - Yes key
- [No] - No key
- Up arrow key
- Down arrow key
- Right arrow key
- Left arrow key

4.1.1 BIT SWITCH PROGRAMMING (FUNCTION 01)

1. [Function] [6] [1] [9] [9] [8]
   then immediately press [Yes]

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. [0] [1] [Yes]
   Bit 7 is on the left, and bit 0 on the right.

```
SERVICE Y/NEXT>
01 BIT SW
```

3. Scroll through the bit switch menu using [*] or [#]
   Example: To see the communication switches:
   [#] x 3
   Then scroll through the bit switches.
   Increment bit switch:
   Decrement bit switch:
   Example: Display bit switch 3: x 3

```
COM DF  :  0000 0000
BITSW 00:  0000 0000
```

4. Adjust the bit switch.
   Example: To change the value of bit 7,
   press [7]

```
COM DF  :  0000 0000
BITSW 03:  0000 0000
```

5. Either:
   - Adjust more bit switches - go to step 3.
   - Finish - [Function]

4.1.2 SYSTEM PARAMETER LIST (FUNCTION 02)

The format of the list is as follows:

1. Function 6 1 9 9 8
   then immediately press Yes
2. 0 2 Yes ◇
3. Finish: Function

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
                  START
PARAMETER LIST
```

4.1.3 ERROR CODE DISPLAY (FUNCTION 03)

1. Function 6 1 9 9 8 ,
   then immediately press Yes
2. 0 3 Yes
3. Either:
   Scroll through the error codes using ▶ or ◀
   Finish - Function

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
ERROR CODE          <>
  1-01 JAN 01 17:30
```

4.1.4 SERVICE MONITOR REPORT (FUNCTION 04)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 0 4 Yes ◇
3. Finish: Function

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
                  START
SERVICE REPORT
```

4.1.5 GROUP 3 PROTOCOL DUMP (FUNCTION 05)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 0 5 Yes
3. 0
4. ◇
5. Finish: Function

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-G3      1-PC
```

```
                  START
PROTOCOL DUMP
```

4.1.6 PC PROTOCOL DUMP (FUNCTION 05)

1. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. 0 5 Yes

```
0-G3      1-PC
```

3. 1

4. ◇

```
                  START
PC PROTOCOL DUMP
```

5. Finish: Function

4.1.7 RAM DISPLAY/REWRITE (FUNCTION 06)

1. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. 0 6 Yes

```
0-MEM.R/W 1-MEM.DUMP
```

3. 0

```
ADDRESS = 000000
DATA    = 00
```

4. Input the address that you wish to see.
   Example: Address 800020
   8 0 0 0 2 0
   Note: If you wish to move the cursor, press ▶.

```
ADDRESS = 800020
DATA    = 20
```

5. If you wish to change the data, type in the new data.
   Example: 80, press 8 0
   Note: If you wish to move the cursor, press ▶.

```
ADDRESS = 800020
DATA    = 80
```

6. Either:
   - View more addresses - go to step 4.
   - Finish - Function

4.1.8 RAM DUMP (FUNCTION 06)

1. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION   KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. 0 6 Yes

```
0-MEM.R/W 1-MEM.DUMP
```

3. [1]

```
MEMORY DUMP  START/N
ADD.000000 - 0000FF
```

4. Enter the first four digits of the start and end addresses. For example, enter “8000” for the start address 800000(H), and enter 8001 for the end address 8001FF(H). Then, press "Start" to print the dump list.

```
MEMORY DUMP  START/N
ADD.800000 - 8001FF
```

5. Finish: [Function]

4.1.9 COUNTER DISPLAY/REWRITE (FUNCTION 07)

1. [Function] [6] [1] [9] [9] [8]
   then immediately press [Yes]

```
FUNCTION    KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. [0] [7] [Yes]

```
0-COUNTER  1-PM
2-TONER
```

3. Either:
   Check the transmitted, received, scanned and printed page counters, and
   the printer and scanner jam counters - press [0]

```
TX :012345
RX :012345
```

   (To see the scanned and printed page counters, press [#].

```
SCAN  :012345
PRINT :012345
```

   To see the printer and scanner jam counters, press [#] again.)

```
S.JAM :000000
P.JAM :000000
```

   Check the PM counter - press [1]

```
PM COUNTER:001234
```

   Check the TONER counter - press [2]
   This is the number of prints made with the current cartridge.

```
TONER     :001234
```

4. To change the contents of a counter, input the new value, then press [Yes] .
5. To finish: [Function]

4.1.10 NCU PARAMETERS (FUNCTION 08)

1. Function 6 1 9 9 8
   then immediately Yes

```
FUNCTION     KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. 0 8 Yes
3. 0

```
0-NCU     1-MODEM
2-DTMF    3-V8
```

4. Scroll through the parameters using ▶ or ◀ . If you want to change a value, enter the new value at the keypad, then press Yes .
   Example: Set NCU parameter 04 to 005.
   ▶ ▶ ▶ ▶ 0 0 5 Yes

```
NCU            KPAD/<>
   NO.04 = 005
```

5. To finish: No Function.

   NOTE: 1) Parameter CC is the Country Code, Parameter 01 is the TX level. Refer to section 4.3 for full details on NCU parameters.
   2) If you change the NCU country code and exit the service mode, the Bit SW country code (System Bit SW 0F) will automatically be changed to the same country code.

Service Tables

4.1.11 MODEM TEST (FUNCTION 08)

1. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION     KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. 0 8 Yes

```
0-NCU     1-MODEM
2-DTMF    3-V8
```

3. 1
4. Scroll through the available tests using ▶ or ◀.
5. ◇
6. To stop the test: ▽

```
MODEM TEST    START/<>
800 Hz
```

7. To finish: No Function

4.1.12 DTMF TONE TEST (FUNCTION 08)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 0 8 Yes
3. 2
4. Scroll through the available tests using ▶ or ◀.
5. ◇
6. To stop the test: ▽
7. To finish: No Function

```
FUNCTION     KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-NCU     1-MODEM
2-DTMF    3-V8
```

```
DTMF TEST    START/<>
TONE  0
```

4.1.13 V.8 MODEM TEST (FUNCTION 08)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 0 8 Yes
3. 3
4. Scroll through the available tests using ▶ or ◀
5. ◇
6. To stop the test: ▽
7. To finish: No Function

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-NCU     1-MODEM
2-DTMF    3-V8
```

```
V8 TEST              START
ANSAM
```

4.1.14 V.34 MODEM TEST (FUNCTION 08)

1. Function 6 1 9 9 8
   then immediately Yes
2. 0 8 Yes
3. ▶ 4
4. Scroll through the available tests using ▶ or ◀

```
FUNCTION     KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-NCU     1-MODEM
2-DTMF    3-V8
```

```
4-V34     5-RINGER
6-DP
```

5. [Start]
6. To stop the test: [Stop]
7. To finish: [No] [Function]

```
V34 SYMBOL RATE   Y/<>
2400SYM/S
```

4.1.15 RINGER TEST (FUNCTION 08)

This test mode cannot be used.

4.1.16 DIAL PULSE TEST (FUNCTION 08)

1. [Function] [6] [1] [9] [9] [8]
   then immediately press [Yes]
2. [0] [8] [Yes]
3. [Start] [6]
4. [Start]
5. To stop : [Stop]
6. To finish: [No] [Function]

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-NCU     1-MODEM
2-DTMF    3-DETECT
```

```
4-V34     5-RINGER
6-DP
```

```
                  START
DP 0
```


4.1.17 OPERATION PANEL TEST (FUNCTION 09)

1. [Function] [6] [1] [9] [9] [8]
   then immediately press [Yes]
2. [0] [9] [Yes]
3. [0]
4. [Start]
5. To stop the test, press [Stop]
6. To finish: [No] [Function]

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-LED/LCD
```

```
                  START
LED/LCD
```

4.1.18 LED ARRAY TEST (FUNCTION 10)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 1 0 Yes
3. 0
4. ◇
5. To stop the test, press ▽
6. To finish: No Function

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-LAMP     1-ADF
```

```
                  START
LAMP         000
```

4.1.19 ADF TEST (FUNCTION 10)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 1 0 Yes
3. 1
4. Place a document in the feeder, then press ◇.
5. To stop the test, press ▽
6. Finish: No Function

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-LAMP   1-ADF
```

```
   START
ADF
```

4.1.20 PRINTER TEST PATTERNS (FUNCTION 11)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 1 1 Yes
3. 0
4. Press a key from 0 to 7.
5. Press ◇.
   A test pattern is printed.
6. To finish: No Function

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-PATTERN   1-MECH
2-WORD
```

```
PATTERN PRINT    KPAD
0-9
```

4.1.21 PRINTER MECHANISM TEST - FREE RUN (FUNCTION 11)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 1 1 Yes
3. 1
4. ◇
5. To stop the test, press ▽
6. To finish: No Function

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

```
0-PATTERN   1-MECH
```

```
   START
MECH
```

NOTE: Make sure that there is some paper in the cassette before starting the test.

4.1.22 RAM TESTS (FUNCTION 12)

1. Function 6 1 9 9 8
   then immediately press Yes
2. 1 2 Yes
3. Either:
   Test the SRAM: Press 0 ◇
   Test the DRAM: Press 1 ◇
   Test the SAF card: Press 2 ◇

   If the test is successful, the display shows "OK".
   If the test is unsuccessful, the display shows "ADDRESS=".
4. To finish: No Function.

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

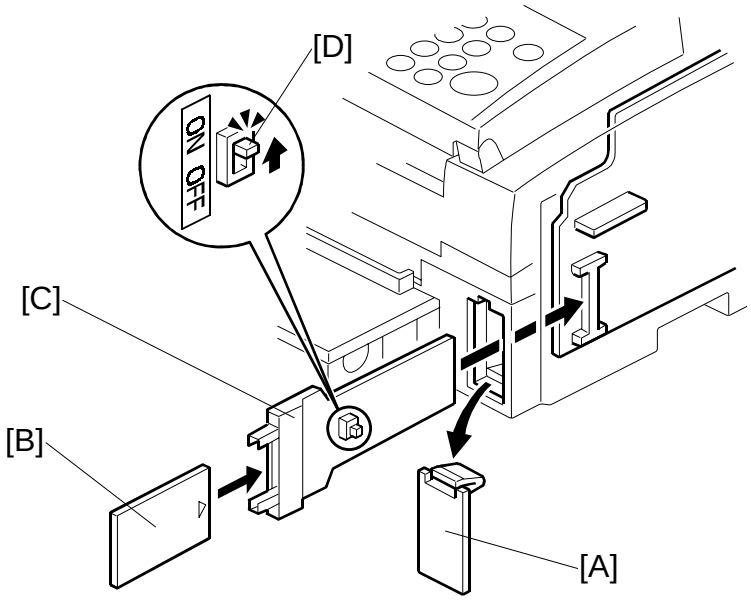
```
0-SRAM      1-DRAM
2-SAFCARD   3-M→R
```

Service Tables

4.1.23 SOFTWARE DOWNLOAD (FUNCTION 12)

This function copies software from an external Flash memory card to the Flash ROM on the FCU inside the machine.
The new software copy tool (P/N: H5479352) must be used for this procedure.

1. Turn off the machine.



H547M501.WMF

2. Remove the IC card cover [A].
   Connect the Flash memory card [B] with the software copy tool [C]. Then, insert the copy tool into the IC card slot as shown.
   NOTE: The switch on the copy tool [D] must be at the **ON** position.
3. Turn on the machine.
4. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

5. 1 2 Yes

```
0-SRAM       1-SAF
2-SAFCARD    3-M->R
```

6. ▶ 4
7. ◇
   If the software downloads successfully, the display shows "**OK**".
   If the software download fails, the display shows "**CANNOT PROGRAM**".

```
OK!!
COPY MACH <- FLROM
```

8. To finish, press Function.

9. Turn off the machine and disconnect the copy tool. Then turn the machine back on.
10. Print out the system parameter list and check the ROM version on it.

The following table shows the switch settings for each procedures using the software copy tool.

Program Items	Switch Settings
Software download	On
Software upload	Off
SRAM data upload	Off
SRAM data download	Off
ISDN G4 software download	Off

4.1.24 SOFTWARE UPLOAD (FUNCTION 12)

This function copies software from the FCU inside the machine to an external memory card.

1. Turn off the machine.
2. Connect the Flash memory card and the software copy tool as shown in the previous section.
   Note: The switch [D] on the tool must be at the **OFF** position.
3. Turn on the machine.
4. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

5. 1 2 Yes

```
0-SRAM       1-SAF
2-SAFCARD    3-M->R
```

6. 3 Start
   If the software uploads successfully, the display shows "**OK**".

```
OK!!
COPY MACH -> FLROM
```

If the software upload fails, the display shows "**NG**".

```
NG!!
COPY MACH -> FLROM
```

7. Finish : Function
8. Turn off the machine and disconnect the tool. Then turn the machine back on again.

4.1.25 SRAM DATA UPLOAD (FUNCTION 12)

This function copies all the data stored in the SRAM on the FCU inside the machine to the Flash memory card. Use this before replacing a damaged FCU to save programmed settings.

1. Turn off the machine.
2. Connect the Flash memory card and the software copy tool as shown in section 4.1.22.
   NOTE: The switch on the copy tool must be **OFF** position.
3. Turn on the machine.
4. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

5. 1 2 Yes

```
0-SRAM       1-SAF
2-SAFCARD    3-M->R
```

6. ▶ 6

```
OK!!
COPY MACH -> SRAM
```

7. ◇
   If the SRAM data uploads successfully, the display shows "**OK**".

If the SRAM upload fails, the display shows "**CANNOT PROGRAM**".

8. Finish : Function
9. Turn off the machine and disconnect the tool. Then turn the machine back on.

4.1.26 SRAM DATA DOWNLOAD

This function copies the data stored in an external Flash memory card to the FCU inside the machine. Use this after replacing a damaged FCU to save any previously programmed settings.

1. Turn off the machine.
2. Connect the Flash memory card and the Flash memory copy tool as shown in section 4.1.22.
   NOTE: The switch on the copy tool must be **OFF** position.
3. Turn on the machine.
4. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

5. 1 2 Yes

```
0-SRAM       1-SAF
2-SAFCARD    3-M->R
```

6. ▶ 5

```
OK!!
COPY MACH <- SRAM
```

7. ◈
   If the SRAM data downloads successfully, the display shows "**OK**".

If the SRAM download fails, the display shows "**CANNOT PROGRAM**".

10. Finish : Function

11. Turn off the machine and disconnect the tool. Then turn the machine back on.

4.1.27 ISDN G4 SOFTWARE DOWNLOAD

This procedure copies the G4 software from the Flash memory card to the optional ISDN G4 board Flash ROM.

1. Turn off the machine.
2. Connect the Flash memory card and the Flash memory copy tool as shown in section 4.1.22.
   NOTE: The switch [D] on the tool must be at the **OFF** position.
3. Turn on the machine.

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

4. Function 6 1 9 9 8
   then immediately press Yes
5. 1 2 Yes

```
0-SRAM      1-SAF
2-SAFCARD   3-M->R
```

6. ◉ 7

```
OK!!
SIG4 ROM COPY
```

7. ◈
   If the G4 program data downloads successfully, the display shows "**OK**".

If the Modem download fails, the display shows "**CANNOT PROGRAM**".

12. Finish : Function

13. Turn off the machine and disconnect the tool. Then turn the machine back on.

4.1.28 SERVICE STATION FAX NUMBER (FUNCTION 13)

1. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. 1 3 Yes

```
S.S. NO.          KPAD
■■■■■■■■■■■■■■■■■■■
```

3. Input the telephone number of the service station that will receive Auto Service calls from this machine.

   To erase the telephone number: press No

```
S.S. NO.          KPAD
212-5555■■■■■■■■■■■
```

4. If the display is correct: Yes Function

4.1.29 SERIAL NUMBER (FUNCTION 14)

1. Function 6 1 9 9 8
   then immediately press Yes

```
FUNCTION KPAD/NEXT>
■■SERVICE FUNCTIONS
```

2. 1 4 Yes

```
SERIAL #          KPAD
■■■■■■■■■■■■■■■■■■■
```

3. Enter the serial number at the keypad.
   To correct a mistake: No

```
SERIAL #       KPAD/Y/N
RICOH 1234567
```

4. If the display is correct: Yes
5. Finish: Function

4.2 BIT SWITCHES

⚠WARNING

Do not adjust bit switches described as "Not used", as this may cause the machine to malfunction or to operate in a manner that is unacceptable under local regulations. Such bits are only for use in other areas, such as Japan.

NOTE: 1) This manual does not list default settings for bit switches. Refer to the System Parameter List.
2) Any changed from the Schmidt1 are shaded.

4.2.1 SYSTEM SWITCHES

System Switch 00

No	FUNCTION	COMMENTS
0 1	**RAM Reset** **Bit 1 Bit 0 Reset Level** 0 0 No reset 0 1 Reset Level 2 1 0 Reset Level 3 1 1 Not used	**Reset Level 3:** Erases all image data files stored in the SAF memory and communication files (e.g. substitute RX files). This is the recommended setting when the SAF requires clearing. **Reset Level 2:** This level erases the following items in addition to those erased by Reset Level 3: own telephone number, bit switches (excluding country code), RTI/TTI/CSI, report data, programmed telephone numbers (Quick/Speed/Groups, service station, etc.), NCU parameters, and personal codes. The NCU country code is also set to the same as the bit switch country code (System Bit Switch 0F). After erasing, the machine automatically changes these two bits back to 0. **No reset:** Normal operation **Cross-reference** **RAM Reset Level 1 (Factory reset):** Change the RAM address data from 800005(H) to FF(H), then turn the machine off and on. In addition to those items erased by Reset Level 2, the clock, country code (the default country code is UK), scan margin settings and print registration settings are erased.

Service Tables

System Switch 00		
No	**FUNCTION**	**COMMENTS**
2	Technical data printout on Journal **0:** Disabled **1:** Enabled	1: Instead of a personal code, the Journal lists the following data for each analog G3 communication. E.g. 32 V34 288 M 01 00 03 02 **First number:** Symbol rate (V.34 only) **Second number:** Final modem type used **Third number:** Final date rate (for example, 288 means 28.8 KBPS) **Fourth number:** M means modem EQM. / L means RX level. **Fifth and sixth number:** Line quality data. This is either a measurement of the error rate or the RX level, depending on the bit 3 setting below. (An M on the report indicates that it is error rate, and an L indicates RX level.) The left-hand figure is the high byte and the right-hand figure is the low byte (refer to the note after this table for how to read the RX level). If it measures the error rate, a larger number means more errors. **Seventh number (RX mode only):** Total number of error lines that occurred during non-ECM reception. **Eighth number (RX mode only):** Total number of burst error lines that occurred during non-ECM reception. The seventh and eighth numbers are fixed at 00 for transmission records and ECM reception records.
3	Line quality data output method **0:** Error rate measurement during image data transmission **1:** Rx level	This bit determines the data type printed in the Journal when bit 2 (above) enables a technical data printout.
4	Line error marks **0:** Disabled **1:** Enabled	If this bit is 1, a mark will be printed on the left edge of the page at any place where a line error occurred in the data. A noisy line causes such errors, for example.
5	Communication parameter display **0:** Disabled **1:** Enabled	This is a faultfinding aid. The LCD shows the key parameters (see the next page). This is normally disabled because it cancels the CSI display for the user. Be sure to reset this bit to 0 after testing.
6	Protocol dump list output **0:** Disabled **1:** Enabled	This is used for communication troubleshooting. It shows the content of the transmitted facsimile protocol signals. Always reset this bit to 0 after testing. The setting of system switch 09 bit 6 determines the types of communication that the list is printed after.

System Switch 00		
No	**FUNCTION**	**COMMENTS**
7	Amount of protocol dump data in one protocol dump list print operation **0:** Up to the limit of the memory area for protocol dumping **1:** Last communication only	Change this bit to 1 if you want to have a protocol dump list of the last communication only.

How to calculate the RX level listed on the Journal (when bit 2 of system switch 00 is set to 1)

Example: 32 V34 288 **L 01 00** 00 00

The four-digit hexadecimal value (N) after L indicates the RX level.
The high byte is given first, followed by the low byte. Divide the decimal value of N by -16 to get the RX level.

In this above example, the decimal value of N (=0100[H]) is 256.
So, the actual RX level is 256/-16 = -16 dB.

G3 Communication Parameters

Mode	**DCS: ITU-T standard NSS: Non-standard G3**
Modem rate	336: 33600 BPS 168: 16800 BPS 312: 31200 BPS 144: 14400 BPS 288: 28800 BPS 120: 12000 BPS 264: 26400 BPS 96: 9600 BPS 240: 24000 BPS 72: 7200 BPS 216: 21600 BPS 48: 4800 BPS 192: 19200 BPS 24: 2400 BPS
Communication mode	ECM: With ECM NML: With no ECM
Compression mode	MMR: MMR compression MR: MR compression MH: MH compression JBO: JBIG optional compression JBB: JBIG standard compression
Resolution	F: Fine, transmitted at 8 x 15.4 dots per mm D: Detail, transmitted at 8 x 7.7 dots per mm S: Standard, transmitted at 8 x 3.85 dots per mm 21: Standard (200 x 100 dpi) 22: Detail (200 x 200 dpi)
I/O rate	0: 0 ms/line 10: 10 ms/line 25: 2.5 ms/line 20: 20 ms/line 5: 5 ms/line 40: 40 ms/line ”40” is displayed while receiving a fax message using AI short protocol.
Width and reduction	A4: A4 (8.3"), no reduction B4: B4 (10.1") no reduction

G4 Communication Parameters

Compression mode	MMR: MMR compression MR: MR compression MH: MH compression
Resolution	21: Standard (200 x 100 dpi) 22: Detail (200 x 200 dpi) 24: Fine (200 x 400 dpi)
Width and reduction	A4: A4 (8.3"), no reduction B4: B4 (10.1"), no reduction (tx only) A3: A3 (11.7"), no reduction (tx only)
Transfer	T: Transfer - : Other
Confidential	C: Confidential - : Other
Other parameters	The following information is shown in 6-bit format. Bit 1 is the first bit from the left, and bit 6 is at the right end. Bit 1 - Smoothing 0: Enabled, 1: Disabled (Smoothing is disabled in halftone mode.) Bit 2 - CIL printing 0: Enabled, 1: Disabled Bit 3 - Not used Bit 4 - mm/inch conversion 0: Disabled, 1: Enabled Bit 5 - Engine type 0: mm, 1: inch Bit 6 - Resolution unit 0: mm, 1: inch

System Switch 01		
No	**FUNCTION**	**COMMENTS**
0	PM call **0:** Disabled **1:** Enabled	This bit switch determines whether the machine will send an Auto Service Call to the service station when it is time for PM.
1-7	Not used	Do not change these settings.

System Switch 02		
No	**FUNCTION**	**COMMENTS**
0	Memory file transfer **0:** Disabled **1:** Enabled	**1:** All messages in the memory (including confidential RX messages) are sent to the fax number, which is programmed as the service station. Always reset this bit to zero after transfer. **Cross-reference** Service station number programming: Function 13
1-5	Not used	Do not change these settings.
6 **7**	**Memory read/write by RDS** **Bit 7 6 Setting** 0 0 Always disabled 0 1 User selectable 1 0 User selectable 1 1 Always enabled	**(0,0):** All RDS systems are always locked out. **(0,1), (1,0):** At any time, an RDS system can access the machine. **(1,1):** At any time, an RDS system can access the machine.

System Switch 03		
No	**FUNCTION**	**COMMENTS**
0 to 7	Length of time that RDS is temporarily switched on when bits 6 and 7 of System Switch 02 are set to "User selectable"	00 - 99 hours (BCD). This data is only valid if bits 6 and 7 of System Switch 02 are set to "User selectable". The default setting is 24 hours.

System Switch 04		
No	**FUNCTION**	**COMMENTS**
0-2	Not used	Do not change these settings.
3	Dedicated transmission parameter programming **0:** Disabled **1:** Enabled	Set this bit to 1 before changing any dedicated transmission parameters.
4	Inclusion of the Start key in Keystroke Programs **0:** Not needed **1:** Needed	**0:** The user does not need to press the Start key when operating a keystroke program.
5	Not used	Do not change the settings.
6	CSI programming level **0:** User level **1:** Service level	**1:** Only a service function can program the CSI.
7	Telephone line type programming mode **0:** User level **1:** Service level	**1:** Only a service function can program the telephone line type selection.

System Switch 05		
No	**FUNCTION**	**COMMENTS**
0-1	Not used	Do not change these settings.
2	Display of both RTI and CSI on the LCD **0:** Disabled **1:** Enabled	**1:** Both RTI and CSI will be displayed alternately on the LCD.
3-7	Not used	Do not change these settings.

System Switch 06		
No	**FUNCTION**	**COMMENTS**
0	Use of the Stop key during memory transmission **0:** Disabled **1:** Enabled	**1:** The Stop key can be used to halt memory transmissions. However, users might accidentally cancel another person's memory transmission in progress.
1-3	Not used	Do not change these settings.
4	Use of the Stop key during memory transmission **0:** Disabled **1:** Enabled	**1:** The Stop key can be used to halt memory transmissions. After pressing the Stop key, a message (STOP & CLR FILE?) appears on the LCD.
5	PC Fax Expander option **0:** Not installed **1:** Installed	Change this bit to 1 when installing the PC Fax Expander option.
6-7	Not used	Do not change these settings.

System Switch 07 - Not used (do not change any of these settings)
System Switch 08 - Not used (do not change any of these settings)

System Switch 09		
No	**FUNCTION**	**COMMENTS**
0	Not used	Do not change this setting.
1	Inclusion of communications in the Journal when no image data was exchanged. **0:** Disabled **1:** Enabled	0: The Journal lists communications that reached phase C (message TX/RX) of the T.30 protocol. **1:** The Journal lists communications that reached phase A (call setup) of T.30 protocol. This includes telephone calls.
2	Automatic error report printout **0:** Disabled **1:** Enabled	**0:** Error reports are not printed. **1:** Error reports will print automatically after all failed communications, excluding polling reception and immediate transmissions.
3	Print error code on error report **0:** No **1:** Yes	**1:** Error codes are printed on the error reports.
4	Listing of Confidential IDs on the Personal Code List **0:** Disabled **1:** Enabled	**1:** Confidential IDs registered with Personal Codes by the users will appear on the Personal Code List.
5	Power failure report **0:** Disabled **1:** Enabled	**1:** A power failure report automatically prints after the power is switched on if a fax message disappears from memory when the power was turned off last.
6	Conditions for printing the protocol dump list **0:** Print for all communications **1:** Print only when there is a communication error	This switch becomes effective only when system switch 00 bit 6 is set to 1. **1:** Set this bit to 1 when you wish to print a protocol dump list only for communications with errors.
7	Priority given to various types of remote terminal ID when printing reports **0:** RTI > CSI > Dial label > Tel. Number **1:** Dial label > Tel. number > RTI > CSI	This bit determines which set of priorities the machine uses when listing remote terminal names on reports. Dial Label: The name stored with the Quick/Speed Dial number by the user.

System Switch 0A		
No	**FUNCTION**	**COMMENTS**
0	Not used	Do not change these settings
1	Default communication mode **0:** G3 **1:** G4	These bits determine the machine's standby default communication mode if a G4 option has been installed.
2	Not used	Do not change these settings.

3	Continuous polling reception **0:** Disabled **1:** Enabled	This feature allows a series of stations to be polled in a continuous cycle.
4	Dialing on the ten-key pad when the handset is off-hook **0:** Disabled **1:** Enabled	**1:** The user can dial on the ten-key pad when the handset is off-hook. This switch cannot be used in the I-Schmidt3.
5	On-hook dial **0:** Disabled **1:** Enabled	**0:** On-hook dial is disabled. This switch cannot be used in the I-Schmidt3.
6	Line used for G3 transmission **0:** PSTN **1:** ISDN	If an ISDN kit has been installed, this bit determines whether G3 transmissions go out over the PSTN or the ISDN.
7	Line used when the machine falls back to G3 from G4 if the other end is not a G4 machine **0:** PSTN **1:** ISDN	This bit switch has no effect if Communication Switch 07 bit 0 is set to 0.

System Switch 0B

No	FUNCTION	COMMENTS
0 **1**	Automatic reset timer **Bit 1 Bit 0 Timer setting** 0 0 1 minute 0 1 3 minutes 1 0 5 minutes 1 1 No limit	**(1, 1):** Automatic reset is disabled. **(Other):** The machine returns to standby mode when the timer expires after the last operation.
2 **3**	Power Saver mode timer **Bit 3 Bit 2 Time Limit** 0 0 1 minute 0 1 3 minutes 1 0 5 minutes 1 1 No limit	**(1, 1):** Automatic Power Saver mode is disabled. **(Other):** The machine goes into Power Saver mode when the timer expires after the last operation. **Cross-reference** Power Saver modes: Section 2.3.1
4-6	Not used	Do not change these settings.
7	Keys to be pressed to exit the energy saver mode **0:** Only the energy saver key **1:** Any key	**1:** Any key can be pressed to exit the energy save mode

System Switch 0C - Not used (do not change any of these settings)
System Switch 0D - Not used (do not change any of these settings)
System Switch 0E - Not used (do not change any of these settings)

System Switch 0F		
No	**FUNCTION**	**COMMENTS**
0 to 7	Country code for functional settings (Hex) 00: France 10: Not used 01: Germany 11: USA 02: UK 12: Asia 03: Italy 13: Not used 04: Austria 14: Hong Kong 05: Belgium 15: South Africa 06: Denmark 16: Australia 07: Finland 17: New Zealand 08: Ireland 18: Singapore 09: Norway 19: Malaysia 0A: Sweden 20: Turkey 0B: Swiss. 21: Greece 0C: Portugal 0D: Holland 0E: Spain 0F: Israel	This country code determines the factory settings of bit switches and RAM addresses. However, it has no effect on the NCU parameter settings and communication parameter RAM addresses. **Cross-reference** NCU country code: Function 08, parameter CC. The bit switch country code will automatically be changed to the same country code with the NCU country code when you change the NCU country code and exit the service mode. **NOTE: If RAM reset level 1 is done, this bit switch resets to 02 (UK).**

System Switch 10		
No	**FUNCTION**	**COMMENTS**
0 to 7	Threshold memory level for parallel memory transmission	Threshold mount = N x 64 kbytes N can be between 00 - FF(H) Default setting: 04(H) = 256 kbytes

System Switch 11		
No	**FUNCTION**	**COMMENTS**
0	TTI printing position **0:** Superimposed on the page data **1:** Printed before the data leading edge	Change this bit to 1 if the TTI overprints information that the customer considers to be important (G3 transmissions).
1	CIL printing position **0:** Printed before the data leading edge **1:** Superimposed on the page data	Change this bit to 1 if the CIL overprints information that the customer considers to be important (G4 transmissions).
2-5	Not used	Do not change these settings.

6	Memory reception if no RTI or CSI received **0:** Reception disabled **1:** Reception enabled only when there is no problem with the printer mechanism	This switch setting is dependent on user parameter switch 05 bit 1. This Sw U.P.05 bit 1 -- 0 : Reception always enabled 0 1 : Reception disabled 1 1 : Reception enabled only there is no problem with the printer mechanism
7	Use of parallel memory transmission with G4 transmission **0:** Disabled **1:** Enabled	This bit determines whether parallel transmission can be used with a G4 transmission or not.

System Switch 12		
No	**FUNCTION**	**COMMENTS**
0 to 7	TTI printing position in the main scan direction	08 to 92 (BCD) mm. Only input even numbers. This setting determines the TTI print start position from the left edge of the paper. If the TTI is too far to the right, the file number, which is on the top right of the page, may obscure it.

System Switch 13 - Not used (do not change any of these settings)
System Switch 14 - Not used (do not change any of these settings)

System Switch 15		
No	**FUNCTION**	**COMMENTS**
0	Not used	Do not change this setting.
1	Programming with European characters **0:** Disabled **1:** Enabled	**1:** The user can program with European characters (e.g. "**ä**", "**å**") for the TTI, Quick Dial labels, etc.
2-7	Not used	Do not change these settings.

System Switch 16 - Not used (do not change any of these settings)

System Switch 17		
No	**FUNCTION**	**COMMENTS**
0	Not used	Do not change this setting.
1	Direct fax number entry **0:** Disabled **1:** Enabled	**0:** The user must place the original on the ADF before dialing.
2-4	Not used	Do not change these settings.
5	Inclusion of the Yes key when Quick Dials are continuously selected for destinations **0:** Not needed **1:** Needed	**1:** The user must press the Yes key after each Quick Dial key. This is to prevent the user from selecting incorrect destinations.

6	Notify user when the communication is complete **0:** Not notify **1:** Notify	**1:** The machine notifies the user with a beeper when the communication is complete.
7	Not used	Do not change this setting.

System Switch 18 - Not used (do not change any of these settings)

System Switch 19		
No	**FUNCTION**	**COMMENTS**
0-5	Not used	Do not change these settings
7	Line used for PC memory transmission when the destination is not selected from the Quick or Speed Dials **0:** G3 **1:** G4	If an ISDN kit has been installed, this bit determines whether PC memory transmissions go out over G3 or G4.

System Switch 1A - Not used (do not change any of these settings)
System Switch 1B - Not used (do not change any of these settings)
System Switch 1C - Not used (do not change any of these settings)
System Switch 1D - Not used (do not change any of these settings)
System Switch 1E - Not used (do not change any of these settings)
System Switch 1F - Not used (do not change any of these settings)

4.2.2 SCANNER SWITCHES

Scanner Switch 00		
No	**FUNCTION**	**COMMENTS**
0-1	Not used	Do not change these settings.
2 **3**	Maximum transmittable document length **Bit 3 2 Setting** 0 0 600 mm 0 1 1200 mm 1 0 Not used 1 1 Not used	If the user wants to send very long documents such as well logs, select the higher setting.
4	OR processing in immediate TX and copying (Standard resolution) **0:** Disabled **1:** Enabled	**0:** The machine scans the document in 3.85 line/mm steps, then transmits or makes copies. **1:** The machine scans the document in 7.7 line/mm steps. Each pair of lines goes through OR processing before transmission or copy making. Toner may be used up earlier if OR processing is enabled.
5	OR processing in immediate TX and copying (Detail resolution) **0:** Disabled **1:** Enabled	**0:** The machine scans the document in 7.7 line/mm steps, then transmits or makes copies. **1:** The machine scans the document in 15.4 line/mm steps.
6-7	Not used	Do not change these settings.

Scanner Switch 01 - Not used (do not change any of these settings)
Scanner Switch 02 - Not used (do not change any of these settings)
Scanner Switch 03 - Not used (do not change any of these settings)
Scanner Switch 04 - Not used (do not change any of these settings)
Scanner Switch 05 - Not used (do not change any of these settings)
Scanner Switch 06 - Not used (do not change any of these settings)
Scanner Switch 07 - Not used (do not change any of these settings)
Scanner Switch 08 - Not used (do not change any of these settings)
Scanner Switch 09 - Not used (do not change any of these settings)
Scanner Switch 0A - Not used (do not change any of these settings)
Scanner Switch 0B - Not used (do not change any of these settings)
Scanner Switch 0C - Not used (do not change any of these settings)
Scanner Switch 0D - Not used (do not change any of these settings)
Scanner Switch 0E - Not used (do not change any of these settings)
Scanner Switch 0F - Not used (do not change any of these settings)

4.2.3 PRINTER SWITCHES

Printer Switch 00		
No	**FUNCTION**	**COMMENTS**
0	Page separation mark **0:** Disabled **1:** Enabled	**0:** No marks printed. **1**: If an incoming fax requires two sheets to print, the machine prints an "x" inside a small box at the bottom right hand corner of the first sheet. Then, it prints a "2" inside a small box at the top right hand corner of the second sheet. This helps the user identify pages that have been split up.
1	Repetition of data when the received page is longer than the printer paper **0:** Disabled **1:** Enabled	**0:** The next page continues from where the previous page left off. **1:** The final few mm of the previous page are printed at the top of the next page. See section 2.2.12 for details.
2-7	Not used	Do not change the settings.

Printer Switch 01		
No	**FUNCTION**	**COMMENTS**
0	Reset the fusing unit failure **0:** Off **1:** On (Clear)	When a fusing error occurs, set this bit to 1 after fixing the problem. The machine then resets the fusing error. Switch the machine off/on and this bit will reset itself to 0.
1-7	Not used	Do not change the settings.

Printer Switch 02		
No	**FUNCTION**	**COMMENTS**
0	Paper Feed Priority **0:** Paper feed unit >> Multi-purpose feeder >> Standard cassette **1:** Paper feed unit >> Standard cassette >> Multi-purpose feeder	This bit determines which set of priorities the machine uses for feeding the paper when all the cassettes contain the same paper size.
2-7	Not used	Do not change these settings.

Printer Switch 03		
No	**FUNCTION**	**COMMENTS**
0	Reduce the length of received data **0:** Disabled **1:** Enabled	**0:** Incoming pages are printed without length reduction. **Cross-reference** Page separation threshold: Printer Switch. 03, bits 4 to 7. **1:** Incoming pages are reduced in the lengthwise direction when printing. **Cross-reference** Reduction ratio: Printer Switches 04/05 Page separation and data reduction: section 2-2-12
1-3	Not used	Do not change these settings.
4 **to** **7**	Page separation threshold (with reduction disabled in switch 03 bit 0 above) If the incoming page is up to x mm longer than the copy paper, the excess portion will not print. If the incoming page is more than x mm longer than the copy paper, the excess portion will print on the next page. These four bits determine the value of x. Hex value of bits 4 to 7 — x (mm) 0 — 0 1 — 1 and so on until F — 15 **Cross-reference** Page separation and data reduction: section 2-2-12 Length reduction On/Off: Printer Switch 03, Bit 0	

Printer Switches 04 and 05		
No	**FUNCTION**	**COMMENTS**
0 **to** **7**	Reduction ratios used for different paper sizes (with reduction enabled in switch 03-bit 0 above) If reduction is enabled, the data will be reduced in the lengthwise direction before printing. These switches determine the maximum reduction ratio for each paper size. **Cross-reference** Page separation and data reduction: section 2.2.12. Switch 04/05 Paper used Bit0 A5 sideways Bit1 Not used Bit2 LT Bit3 A4 Bit4 F Bit5 LG Bit6 Not used Bit7 Not used SW04 SW05 Reduction Ratio 1 0 4/3 0 1 8/7 1 0 12/11	

Printer Switch 06 - Not used (do not change any of these settings)
Printer Switch 07 - Not used (do not change any of these settings)
Printer Switch 08 - Not used (do not change any of these settings)
Printer Switch 09 - Not used (do not change any of these settings)
Printer Switch 0A - Not used (do not change any of these settings)
Printer Switch 0B - Not used (do not change any of these settings)
Printer Switch 0C - Not used (do not change any of these settings)
Printer Switch 0D - Not used (do not change any of these settings)
Printer Switch 0E - Not used (do not change any of these settings)
Printer Switch 0F - Not used (do not change any of these settings)

4.2.4 COMMUNICATION SWITCHES

Communication Switch 00		
No	**FUNCTION**	**COMMENTS**
0 **1**	Compression modes available in receive mode **Bit 1 0 Modes** 0 0 MH only 0 1 MH/MR 1 0 MH/MR/MMR 1 1 Not used	These bits determine the compression capabilities declared in phase B (handshaking) of T.30 protocol.
2 **3**	Compression modes available in transmit mode **Bit 3 2 Modes** 0 0 MH only 0 1 MH/MR 1 0 MH/MR/MMR 1 1 Not used	These bits determine the compression capabilities used in the transmission and declared in phase B (handshaking) of T.30 protocol.
4	Not used	Do not change these settings.
5	JBIG reception mode **0:** Standard mode only **1:** Standard and optional mode (default)	If this bit is 0, JBIG optional mode is switched off for reception. Change the setting when communication problems occur using the JBIG compression. This switch is effective only in the USA models.
6	Priority for JBIG mode used for transmission **0:** Standard mode **1:** Optional mode (default)	This bit determines the priority for the compression mode used for JBIG transmission. Change the setting when communication problems occur using the JBIG compression. This switch is effective only in the USA models.
7	Closed network (reception) **0:** Disabled **1:** Enabled	**1:** Reception will not go ahead if the ID code of the other terminal does not match the ID code of this terminal. This function is only available in NSF/NSS mode.

Communication Switch 01		
No	**FUNCTION**	**COMMENTS**
0	ECM **0:** Disabled **1:** Enabled	If this bit is 0, ECM is switched off for all communications.
1	Not used	Do not change this settings.

2 **3**	Wrong connection prevention method Bit 3 Bit 2 Setting 0 0 None 0 1 8 digit CSI 1 0 4 digit CSI 1 1 CSI/RTI	(01) - The machine will not transmit if the last 8 digits of the received CSI do not match the last 8 digits of the dialed telephone number. This does not work for manual dialing. (10) - The same as above, except that only the last 4 digits are compared. (11) - The machine will not transmit if the other end does not identify itself with an RTI or CSI. (00) - Nothing is checked; transmission will always go ahead. **Note:** When enabling wrong connection prevention, disable AI short protocol.
4	Operator call if no response is received in reply to NSF/DIS **0:** Disabled **1:** Enabled	Set this bit to 1 if the user expects to receive telephone calls at the same number that the machine is connected to. The machine will then alert the user if a phone call comes in.
5	Not used	Do not change the setting.
6 **7**	Maximum printable page length available **Bit 7 Bit 6 Setting** 0 0 No limit 0 1 B4 1 0 A4 1 1 Not used	The receiving terminal informs the transmitting terminal of the setting determined by these bits in the pre-message protocol exchange (in the DIS/NSF) frames.

Communication Switch 02		
No	**FUNCTION**	**COMMENTS**
0	Burst error threshold **0:** Low **1:** High	If the received page has more consecutive error lines than the threshold, the machine sends a negative response. The low and high threshold values depend on the sub-scan resolution, and are as follows. **Resolution Standard Detail** Low settings 6 12 High settings 12 24 This bit is ignored if ECM is in use.
1	Acceptable total error line ratio **0:** 5% **1:** 10%	If the error line ratio of a page exceeds the acceptable ratio, RTN will be sent to the other end. This bit is ignored if ECM is in use.
2	Treatment of pages received with errors during G3 reception **0:** Deleted from memory without printing **1:** Printed	**0:** Pages received with errors are not printed.

3	Hang-up decision after receiving a negative code (RTN or PIN) during G3 immediate transmission **0:** No hang-up **1:** Hang-up	**0:** Sends the next page even if RTN or PIN is received. **1:** The machine will send DCN and hang up if it receives RTN or PIN. This bit is ignored for memory transmissions or if ECM is being used.
4-7	Not used	Do not change these settings.

Communication Switch 03		
No	**FUNCTION**	**COMMENTS**
0 to 7	Maximum number of page retransmission in a G3 memory transmission	00 - FF (Hex) times. This bit is ignored if ECM is in use.

Communication Switch 04 - Not used (do not change any of these settings)
Communication Switch 05 - Not used (do not change any of these settings)

Communication Switch 06		
No	**FUNCTION**	**COMMENTS**
0	Dialing requirements: Germany **0:** Disabled **1:** Enabled	This function automatically sets these switches to the required settings for each country after selecting a country code (System Switch 0F).
1	Dialing requirements: Austria **0:** Disabled **1:** Enabled	
2	Dialing requirements: Norway **0:** Disabled **1:** Enabled	
3	Dialing requirements: Denmark **0:** Disabled **1:** Enabled	
4	Dialing requirements: France **0:** Disabled **1:** Enabled	
5	Dialing requirements: Switzerland **0:** Disabled **1:** Enabled	
6	Dialing requirements: USA **0:** Disabled **1:** Enabled	
7	Not used	Do not change these settings.

Communication Switch 07		
No	**FUNCTION**	**COMMENTS**
0	Fallback from G4 to G3 if the other terminal is not a G4 terminal **0:** Disabled **1:** Enabled	Also see System Switch 0A bit 7. Refer to the ISDN G4 option service manual (G4 Internal Switches 17, 18, 1A, 1B, and 1C) for the CPS code set (Cause Value set) to determine G4 to G3 fallback.
1	Not used	Do not change the setting.
2	Use of date and time provided from the network for the CIL **0:** Disabled **1:** Enabled	**0:** The date and time programmed in the receiving terminal is used in the CIL. **1:** The date and time informed in the document layer from the remote terminal (through the network) is used in the CIL
3	Fallback from G4 to G3 reflected in programmed Quick/Speed dials **0:** Fallback enabled (Default) **1:** Always start with G4	**0:** If a communication falls back from G4 to G3, the machine will always start transmission with G3 from the next communication. **1:** The machine will always start to transmit with G4.
4	Fallback from G4 to G3 when G4 communication fails on the ISDN B-channel **0:** Fallback disabled (Default) **1:** Fallback enabled	**1:** Enable this switch only when G4 communication errors occur because the exchanger connects G4 calls to the PSTN. This problem only occurs with some types of exchanger.
5-7	Not used	Do not change the settings.

Communication Switch 08 - Not used (do not change any of these settings)
Communication Switch 09 - Not used (do not change any of these settings)

Communication Switch 0A		
No	**FUNCTION**	**COMMENTS**
0	Memory transmission resumption point for redialing **0:** From the error page **1:** From page 1	**0:** The transmission begins from the page where transmission failed the previous time. **1:** Transmission begins from the first page.
1-6	Not used	Do not change these settings.
7	Emergency calls using 999 **0:** Enabled **1:** Disabled	If this bit is at 1, the machine will not allow you to dial 999 at the auto-dialer.

Communication Switch 0B - Not used (do not change any of these settings)
Communication Switch 0C - Not used (do not change any of these settings)

Communication Switch 0D		
No	**FUNCTION**	**COMMENTS**
0 to 7	The available memory threshold, below which ringing detection (and therefore reception into memory) is disabled	00 to FF (Hex), unit = 2 KB (e.g. 0C(H) = 24 KB) One page is about 24 KB. The machine refers to this setting before each fax reception. If the remaining memory is below this threshold, the machine cannot receive fax messages. If this setting remains at 0, the machine will detect ringing signals and enter receive mode even if there is no available memory. This will result in communication failure.

Communication Switch 0E		
No	**FUNCTION**	**COMMENTS**
0 to 7	Minimum interval between automatic dialing attempts	06 to FF (Hex), unit = 2 s (e.g., 06(H) = 12 s) This value is the minimum time that the machine waits before it dials the next destination.

Communication Switch 0F		
No	**FUNCTION**	**COMMENTS**
0 to 7	Minimum number of times that a destination will dialed when TRD is being used	01 - FF (Hex) times

Communication Switch 10		
No	**FUNCTION**	**COMMENTS**
0 to 7	Memory transmission: Maximum number of dialing attempts to the same destination	01 - FE (Hex) times

Communication Switch 11		
No	**FUNCTION**	**COMMENTS**
0 to 7	Immediate transmission: Maximum number of dialing attempts to the same destination	01 - FE (Hex) times

Communication Switch 12		
No	**FUNCTION**	**COMMENTS**
0 to 7	Memory transmission: Interval between dialing attempts to the same destination	00 - FF (Hex) minutes

Communication Switch 13		
No	**FUNCTION**	**COMMENTS**
0 to 7	Immediate transmission: Interval between dialing attempts to the same destination	00 - FF (Hex) minutes

Communication Switch 14		
No	**FUNCTION**	**COMMENTS**
0	mm-to-inch conversion during transmission **0:** Disabled (default) **1:** Enabled	**0:** Transmitting is always done in mm format. **1:** If the other end only has inch-based resolution for printing, the machine converts the scanned data to inch-format before transmission. Other models use inch-based scanning. In these models, this setting is inch-to-mm conversion.
1-7	Not used	Do not change the settings.

Communication Switch 15 - Not used (do not change any of these settings)

Communication Switch 16		
No	**FUNCTION**	**COMMENTS**
0-1	Not used	Do not change the settings.
2	Optional G4 unit **0:** Not installed **1:** Installed	**1:** Change this bit to 1 when installing the optional G4 unit.
3-5	Not used	Do not change the settings.
6	ISDN G3 Reception **0:** Enabled **1:** Disabled	**1:** Disables ISDN G3 reception
7	Not used	Do not change the settings.

Communication Switch 17		
No	**FUNCTION**	**COMMENTS**
0	SEP (selective polling) reception **0:** Disabled **1:** Enabled	**0:** Disables the SEP (selective polling) signal reception.
1	SUB reception **0:** Disabled **1:** Enabled	**0:** Confidential reception to another maker's machine using the SUB (Sub-address) signal is disabled.
2-7	Not used	Do not change the settings.

Communication Switch 18 - Not used (do not change any of these settings)
Communication Switch 19 - Not used (do not change any of these settings)
Communication Switch 1A - Not used (do not change any of these settings)

Communication Switch 1B - Not used (do not change any of these settings)
Communication Switch 1C - Not used (do not change any of these settings)
Communication Switch 1D - Not used (do not change any of these settings)
Communication Switch 1E - Not used (do not change any of these settings)
Communication Switch 1F - Not used (do not change any of these settings)

4.2.5 G3 SWITCHES

G3 Switch 00		
No	**FUNCTION**	**COMMENTS**
0 **1**	Monitor speaker during communication (TX and RX) **Bit 1 Bit 0 Setting** 0 0 Disabled 0 1 Up to Phase B 1 0 All the time 1 1 Not used	**(0, 0):** The monitor speaker is not in use throughout communication. **(0, 1):** The monitor speaker is on up to phase B in the T.30 protocol. **(1, 0):** Used for testing. The monitor speaker is on throughout communication. Make sure that you reset these bits after testing.
2	Monitor speaker during memory transmission **0:** Disabled **1:** Enabled	**1:** The monitor speaker is in use during memory transmission.
3-7	Not used	Do not change these settings.

G3 Switch 01		
No	**FUNCTION**	**COMMENTS**
0-3	Not used	Do not change these settings.
4	DIS frame length **0:** No limit **1:** 4 bytes	**1:** Only the first 4 bytes in the DIS frame will transmit (set to 1 if there are communication problems with PC-based faxes, which cannot receive extended DIS frames).
5	Not used	Do not change this setting.
6	CED/ANSam emission **0:** Enabled **1:** Disabled	Do not change these settings, unless the any communication problem is caused by the CED/ANSam (V.34) transmission.
7	Not used	Do not change this setting.

G3 Switch 02		
No	**FUNCTION**	**COMMENTS**
0	G3 protocol mode used **0:** Standard and non-standard **1:** Standard only	**1:** Disables NSF/NSS signals (these are in non-standard mode communication).
1-4	Not used	Do not change these settings.
5	Use of modem rate history when dialing using Quick/Speed dials **0:** Disabled **1:** Enabled	**0:** Communications using Quick/Speed dials always start with the highest modem rate. **1:** The machine uses the modem rate history for communications with the same machine when determining the most suitable rate for the current communication.
6	AI short protocol (transmission and reception) **0:** Disabled **1:** Enabled	Refer to Appendix B in the Group 3 Facsimile Manual for details about AI Short Protocol.
7	Short preamble **0:** Disabled **1:** Enabled	Refer to Appendix B in the Group 3 Facsimile Manual for details about AI Short Protocol.

G3 Switch 03		
No	**FUNCTION**	**COMMENTS**
0	DIS detection number (Echo countermeasure) **0:** 1 **1:** 2	**0:** The machine will hang up if it receives the same DIS frame twice. **1:** Before sending DCS, the machine waits for the second DIS, caused by echo on the line.
1	Not used	Do not change this setting.
2	V.8 protocol **0:** Disabled **1:** Enabled	**0:** V.8/V.34 communications will not be possible. **Note:** Do not change this setting unless the line condition is so poor the data rate slows to 14.4 kbps or lower.
3	ECM frame size **0:** 256 bytes **1:** 64 bytes	**1:** The machine transmits with a frame size of 64 bytes. Set this bit to 1 when the other terminal only has a 64 byte frame size.
4	CTC transmission conditions **0:** Ricoh mode (PPR x 1) **1:** ITU-T mode (PPR x 4)	When using ECM, the machine will choose a slower modem rate after receiving PPR once (Ricoh mode) or four times (ITU-T mode). This bit is ineffective in V.34 communications.
5	Modem rate for the next page after receiving a negative code (RTN or PIN) **0:** No change **1:** Fallback	**1:** The TX modem rate of the machine will fall back before sending the next page if it receives a negative code. This bit is ignored if ECM is in use.
6	Not used	Do not change this setting.
7	Polarity change after DIS/NSF detection **0:** Disabled **1:** Enabled	This bit should be set to ”1” only to deal with communication problems caused by certain types of exchanger.

G3 Switch 04		
	FUNCTION	**COMMENTS**
0 to 3	Training error detection threshold	0 - F (Hex): 0 - 15 bits If the number of error bits in the received TCF is below this threshold, the machine informs the sender that the training was successful.
4-7	Not used	Do not change these settings.

G3 Switch 05		
	FUNCTION	**COMMENTS**
0 to 3	Initial TX modem rate **Bit 3 2 1 0 Setting (BPS)** 0 0 0 1 2.4 k 0 0 1 0 4.8 k 0 0 1 1 7.2 k 0 1 0 0 9.6 k 0 1 0 1 12.0 k 0 1 1 0 14.4 k 0 1 1 1 16.8 k 1 0 0 0 19.2 k 1 0 0 1 21.6 k 1 0 1 0 24.0 k 1 0 1 1 26.8 k 1 1 0 0 28.8 k 1 1 0 1 31.2 k 1 1 1 0 33.6 k Other settings - Not used	These bits set the initial starting modem rate for transmission. Use the dedicated transmission parameters if you need to change this for specific receivers.
4 to 5	Initial modem type for 9.6 k or 7.2 KBPS **Bit 5 Bit 4 Setting** 0 0 V.29 0 1 V.17 1 0 Not used 1 1 Not used	These bits set the initial modem type for 9.6 k and 7.2 kbps, if the initial modem rate is set at these speeds.
6-7	Not used	Do not change these settings.

G3 Switch 06		
	FUNCTION	**COMMENTS**
0 to 3	Initial RX modem rate **Bit 3 2 1 0 Setting (BPS)** 0 0 0 1 2.4 k 0 0 1 0 4.8 k 0 0 1 1 7.2 k 0 1 0 0 9.6 k 0 1 0 1 12.0k 0 1 1 0 14.4k 0 1 1 1 16.8 k 1 0 0 0 19.2 k 1 0 0 1 21.6 k 1 0 1 0 24.0 k 1 0 1 1 26.8 k 1 1 0 0 28.8 k 1 1 0 1 31.2 k 1 1 1 0 33.6 k Other settings - Not used	The settings of these bits inform the transmitting terminal of the available modem rate for the receiving machine. Use a lower setting if high speeds pose problems during reception.

G3 Switch 06		
	FUNCTION	**COMMENTS**
4 to 7	Modem types available for reception **Bit 7 6 5 4 Setting** 0 0 0 1 V.27ter 0 0 1 0 V.27ter, V.29 0 0 1 1 V.27ter, V.29, V.33 0 1 0 0 V.27ter, V.29, V33, V17 0 1 0 1 V.27ter, V.29, V.33, V.17, V.34 Other settings - Not used	The settings of these bits inform the transmitting terminal of the available modem type for the receiving machine. V.33 is an exclusive Ricoh mode (NSF).

G3 Switch 07		
	FUNCTION	**COMMENTS**
0 1	PSTN cable equalizer (TX mode) **Bit 1 Bit 0 Setting** 0 0 None 0 1 Low 1 0 Medium 1 1 High	Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Use the dedicated transmission parameters if you need to change this for specific receivers. Also, try using the cable equalizer if one or more of the following symptoms occurs: • Communication error • Modem rate fallback occurs frequently. **Note:** This setting is ineffective in V.34 communications.
2 3	PSTN cable equalizer (RX mode) **Bit 3 Bit 2 Setting** 0 0 None 0 1 Low 1 0 Medium 1 1 High	Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Also, try using the cable equalizer if one or more of the following symptoms occurs: • Communication error with error codes such as 0-20, 0-23, etc. • Modem rate fallback occurs frequently. **Note:** This setting is ineffective in V.34 communications.
4	PSTN external cable equalizer (V.27ter, V.29, V.33/V.17, V.8 rx mode) **0:** Disabled **1:** Enabled	Keep this bit at “1” in most cases.
5	PSTN external cable equalizer (V.34 rx mode) **0:** Disabled **1:** Enabled	Set this bit to 0 when the line quality is good. (e.g. digital PABX) The V.34 modem rate may decrease from equalizer over correction.
6-7	Not used	Do not change these settings.

G3 Switch 08 - Not used (do not change any of these settings)

G3 Switch 09		
No	**FUNCTION**	**COMMENTS**
0 **1**	ISDN cable equalizer (tx mode) **Bit 1 Bit 0 Setting** 0 0 None 0 1 Low 1 0 Medium 1 1 High	Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Use the dedicated transmission parameters for specific receivers. Also, try using the cable equalizer if one or more of the following symptoms occurs. • Communication error • Modem rate fallback occurs frequently.
2 **3**	ISDN cable equalizer (rx mode) **Bit 3 Bit 2 Setting** 0 0 None 0 1 Low 1 0 Medium 1 1 High	Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange. Also, try using the cable equalizer if one or more of the following symptoms occurs. • Communication error with error codes such as 0-20, 0-23, etc. • Modem rate fallback occurs frequently.
4	ISDN external equalizer for V.27ter, V.29, V.33/V.17, V.8 (Rx mode) **0:** Disabled **1:** Enabled	**1:** Keep this bit at “1” in most cases.
5	ISDN external equalizer for V.34 (Rx mode) **0:** Disabled **1:** Enabled	**1:** Keep this bit at “1” in most cases.
6-7	Not used	Do not change the settings.

G3 Switch 0A		
	FUNCTION	**COMMENTS**
0 **1**	Maximum allowable carrier drop during image data reception **Bit 1 Bit 0 Value (ms)** 0 0 200 0 1 400 1 0 800 1 1 Not used	These bits set the acceptable modem carrier drop time. Try using a longer setting if error code 0-22 is frequent.
2-3	Not used	Do not change these settings.

G3 Switch 0A		
	FUNCTION	**COMMENTS**
4	Maximum allowable frame interval during image data reception. **0:** 5 s **1:** 13 s	This bit determines the maximum interval between each EOL signal (end-of-line) or between each ECM frame from the other end. Try using a longer setting if error code 0-21 is frequent.
5	Not used	Do not change this setting.
6	Reconstruction time for the first line in receive mode **0:** 6 s **1:** 12 s	When a computer controls the sending terminal, there may be a delay in receiving page data after the local machine accepts set-up data and sends CFR. If this occurs, set this bit to 1 to give the sending machine more time to send data. Refer to error code 0-20.
7	Not used	Do not change this setting.

G3 Switch 0B		
	FUNCTION	**COMMENTS**
0	Protocol requirements: Europe **0:** Disabled **1:** Enabled	Program these bit switches manually to match local requirements.
1	Protocol requirements: Spain **0:** Disabled **1:** Enabled	
2	Protocol requirements: Germany **0:** Disabled **1:** Enabled	
3	Protocol requirements: France **0:** Disabled **1:** Enabled	
4	PTT requirements: Germany **0:** Disabled **1:** Enabled	
5-7	Not used	Do not change these settings.

G3 Switch 0C		
	FUNCTION	COMMENTS
0 **1**	Pulse dialing method **Bit 1 Bit 0 Setting** 0 0 Normal (P=N) 0 1 Oslo (P=10 - N) 1 0 Sweden (N+1) 1 1 Not used	P = Number of pulses sent out, N = Number dialed.
2-7	Not used	Do not change these settings.

G3 Switch 0D - Not used (do not change these settings)
G3 Switch 0E - Not used (do not change these settings)
G3 Switch 0F - Not used (do not change these settings)

4.3 NCU PARAMETERS

The following tables give the RAM addresses and the parameter calculation units that the machine uses for ringing signal detection and automatic dialing. The factory settings for each country are also given. The RAM read/write (Function 06) must change most of these, but NCU Parameter programming (Function 08) can change some others; if Function 08 is in use, the Remarks column indicates it. The RAM is in hex code unless (BCD) is included in the Unit column.

<table>
<tr><th>Address</th><th>Function</th><th>Unit</th><th>Remarks</th></tr>
<tr><td>81E500</td><td>Country code for NCU parameters</td><td colspan="2">Use the Hex value to program the country code directly into this address, or use the decimal value to program it using Function 08 (parameter C.C.).

Country — Decimal — Hex
France 00 00
Germany 01 01
UK 02 02
Italy 03 03
Austria 04 04
Belgium 05 05
Denmark 06 06
Finland 07 07
Ireland 08 08
Norway 09 09
Sweden 10 0A
Switzerland 11 0B
Portugal 12 0C
Holland 13 0D
Spain 14 0E
Israel 15 0F
USA 17 11
Asia 18 12
Hong Kong 20 14
South Africa 21 15
Australia 22 16
New Zealand 23 17
Singapore 24 18
Malaysia 25 19
Turkey 32 20
Greek 33 21</td></tr>
<tr><td>81E501</td><td>Line current detection time</td><td rowspan="3">20 ms</td><td rowspan="3">Line current is not detected if 81E501 contains FF.</td></tr>
<tr><td>81E502</td><td>Line current wait time</td></tr>
<tr><td>81E503</td><td>Line current drop detect time</td></tr>
</table>

Address	Function	Unit	Remarks
81E504	PSTN dial tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E505	PSTN dial tone frequency upper limit (low byte)		
81E506	PSTN dial tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E507	PSTN dial tone frequency lower limit (low byte)		
81E508	PSTN dial tone detection time	20 ms	If 81E508 contains FF(H), the machine pauses for the pause time (address 81E50D / 81E50E). See Note 3 (Italy).
81E509	PSTN dial tone reset time (low)		
81E50A	PSTN dial tone reset time (high)		
81E50B	PSTN dial tone continuous tone time		
81E50C	PSTN dial tone permissible drop time		
81E50D	PSTN wait interval (low)		
81E50E	PSTN wait interval (high)		
81E50F	PSTN ring-back tone detection time	20 ms	Detection is disabled if this contains FF(H).
81E510	PSTN ring-back tone off detection time	20 ms	
81E511	PSTN detection time for the silent period after ring-back tone detected (low)	20 ms	
81E512	PSTN detection time for the silent period after ring-back tone detected (high)	20 ms	
81E513	PSTN busy tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E514	PSTN busy tone frequency upper limit (low byte)		
81E515	PSTN busy tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E516	PSTN busy tone frequency lower limit (low byte)		
81E517	PABX dial tone frequency range (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E518	PABX dial tone frequency range (low byte)		
81E519	PABX dial tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E51A	PABX dial tone frequency lower limit (low byte)		

Address	Function	Unit	Remarks
81E51B	PABX dial tone detection time	20 ms	If 81E51B contains FF, the machine pauses for the pause time (81E520 / 81E521).
81E51C	PABX dial tone reset time (low)		
81E51D	PABX dial tone reset time (high)		
81E51E	PABX dial tone continuous tone time		
81E51F	PABX dial tone permissible drop time		
81E520	PABX wait interval (high)		
81E521	PABX wait interval (low)		
81E522	PABX ring-back tone detection time	20 ms	If both addresses contain FF(H), tone detection is disabled.
81E523	PABX ring-back tone off detection time	20 ms	
81E524	PABX detection time for the silent period after ring-back tone detected (low)	20 ms	If both addresses contain FF(H), tone detection is disabled.
81E525	PABX detection time for the silent period after ring-back tone detected (high)	20 ms	If both addresses contain FF(H), tone detection is disabled.
81E526	PABX busy tone frequency upper (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E527	PABX busy tone frequency lower (low byte)		
81E528	PABX busy tone frequency lower (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E529	PABX busy tone frequency lower (low byte)		
81E52A	Busy tone ON time: range 1	20 ms	
81E52B	Busy tone OFF time: range 1		
81E52C	Busy tone ON time: range 2		
81E52D	Busy tone OFF time: range 2		
81E52E	Busy tone ON time: range 3		
81E52F	Busy tone OFF time: range 3		
81E530	Busy tone ON time: range 4		
81E531	Busy tone OFF time: range 4		
81E532	Busy tone-continuous tone detection time		

Address	Function	Unit	Remarks
81E533	Busy tone signal state time tolerance for all ranges, and number of cycles required for detection (a setting of 4 cycles means that ON-OFF-ON or OFF-ON-OFF must be detected twice). Tolerance (±) Bit 1 0 0 0 75% Bits 2 and 3 must always 0 1 50% be kept at 0. 1 0 25% 1 1 12.5% Bits 7, 6, 5, 4 - number of cycles required for cadence detection		
81E534	International dial tone frequency upper limit (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E535	International dial tone frequency upper limit (low byte)		
81E536	International dial tone frequency lower limit (high byte)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E537	International dial tone frequency lower limit (low byte)		
81E538	International dial tone detection time	20 ms	If 81E538 contains FF, the machine pauses for the pause time (81E53D / 81E53E). See Note 4 (Belgium).
81E539	International dial tone reset time (low)		
81E53A	International dial tone reset time (high)		
81E53B	International dial tone continuous tone time		
81E53C	International dial tone permissible drop time		
81E53D	International dial wait interval (low)		
81E53E	International dial wait interval (high)		
81E53F	Country dial tone upper frequency limit (high)	Hz (BCD)	If both addresses contain FF(H), tone detection is disabled.
81E540	Country dial tone upper frequency limit (low)		
81E541	Country dial tone lower frequency limit (high)		If both addresses contain FF(H), tone detection is disabled.
81E542	Country dial tone lower frequency limit (low)		
81E543	Country dial tone detection time	20 ms	If 81E543 contains FF, the machine pauses for the pause time (81E548 / 81E549).
81E544	Country dial tone reset time (low)		
81E545	Country dial tone reset time (high)		
81E546	Country dial tone continuous tone time		
81E547	Country dial tone permissible drop time		
81E548	Country dial wait interval (low)		

Address	Function	Unit	Remarks
81E549	Country dial wait interval (high)	20 ms	
81E54A	Time between opening or closing the Ds relay and opening the Di relay	1 ms	See Notes 5, 8, and 9. Function 08 (parameter 11).
81E54B	Break time for pulse dialing	1 ms	See Note 4. Function 08 (parameter 12).
81E54C	Make time for pulse dialing	1 ms	See Note 4. Function 08 (parameter 13).
81E54D	Time between final Di relay closure and Ds relay opening or closing	1 ms	See Notes 5, 8, and 9. Function 08 (parameter 14).
81E54E	Minimum pause between dialed digits (pulse dial mode)	20 ms	See Note 5 and 9. Function 08 (parameter 15).
81E54F	Time waited when a pause is entered at the operation panel		Function 08 (parameter 16). See Note 5.
81E550	DTMF tone on time	1 ms	Function 08 (parameter 17).
81E551	DTMF tone off time		Function 08 (parameter 18).
81E552	Tone attenuation level of DTMF signals while dialing (high frequency group)	- N x 0.5 - 3.5 (dBm)	Function 08 (parameter 19). See Note 7.
81E553	Tone attenuation value difference between high frequency tone and low frequency tone in DTMF signals	- N x 0.5 (dBm)	Function 08 (parameter 20). See Note 7.
81E554	PSTN: DTMF tone attenuation level after dialing (high frequency group)	- N x 0.5 - 3.5 (dBm)	Function 08 (parameter 21). See Note 7.
81E555 to 81E558	Not used		Do not change these settings.
81E559	Grounding time (ground start mode)	20 ms	The Gs relay remains closed for this interval.
81E55A	Break time (flash start mode)	1 ms	The OHDI relay is open for this interval.
81E55B	International dial access code	BCD	For a code of 100: 81E55B - F1 81E55C - 00
81E55C			
81E55D	PSTN access pause time	20 ms	It waits this amount of time for each pause input after the PSTN access code. Up to 7 of these can be input. If this address contains FF[H], the pause time stored in address 81E54F is used.

Address	Function	Unit	Remarks
81E55E	Progress tone detection level, and cadence detection enable flags	Bit 7 Bit 6 Bit 5 dBm 0 0 0 -25.0 0 0 1 -35.0 0 1 0 -30.0 1 0 0 -40.0 1 1 0 -49.0 Bits 2, 0 - See Note 4.	
81E55F to 81E564	Not used		Do not change these settings.
81E565	Inter-city dial prefix (high)	BCD	For a code of 0: 81E565 - FF 81E566 - F0
81E566	Inter-city dial prefix (low)	BCD	
81E567 to 81E568	Not used		Do not change these settings.
81E569	Distinctive ring	Hex	00(H): OFF, 01(H): ON
81E56A	Distinctive ring minimum off time	1ms	
81E56B	Distinctive ring maximum one cycle time	20 ms ± 20 ms	
81E572	Acceptable ringing signal frequency: range 1, upper limit	1000/ N (Hz)	Function 08 (parameter 02).
81E573	Acceptable ringing signal frequency: range 1, lower limit		Function 08 (parameter 03).
81E574	Acceptable ringing signal frequency: range 2, upper limit		Function 08 (parameter 04).
81E575	Acceptable ringing signal frequency: range 2, lower limit		Function 08 (parameter 05).
81E576	Number or rings until a call is detected	1	Function 08 (parameter 06).
81E577	Minimum required length of the first ring	20 ms	See Note 6. Function 09 (parameter 07).
81E578	Minimum required length of the second and subsequent rings	20 ms	Function 08 (parameter 08).
81E579	Ringing signal detection reset time (low)	20 ms	Function 08 (parameter 09).
81E57A	Ringing signal detection reset time (high)		Function 08 (parameter 10).
81E57B to 81E580	Not used		Do not change these settings.
81E581	Interval between dialing the last digit and switching the Oh relay over to the external telephone when dialing from the operation panel in handset mode.	20 ms	Factory setting: 500 ms

Address	Function	Unit	Remarks
81E582	Bits 0 and 1 - Handset off-hook detection time **Bit 1 0 Setting** 0 0 200 ms 0 1 800 ms Other Not used Bits 2 and 3 - Handset on-hook detection time **Bit 3 2 Setting** 0 0 200 ms 0 1 800 ms Other Not used Bits 4 to 7 - Not used		
81E5A1	Acceptable CED detection frequency upper limit (high byte)	BCD (Hz)	If both addresses contain FF(H), tone detection is disabled.
81E5A2	Acceptable CED detection upper frequency upper limit (low byte)		
81E5A3	Acceptable CED detection frequency lower limit (high byte)	BCD (Hz)	If both addresses contain FF(H), tone detection is disabled.
81E5A4	Acceptable CED detection upper frequency lower limit (low byte)		
81E5A5	CED detection time	20 ms ± 20 ms	Factory setting: 200 ms
81E5A6	Acceptable CNG detection frequency upper limit (high byte)	BCD (Hz)	If both addresses contain FF(H), tone detection is disabled.
81E5A7	Acceptable CNG detection upper frequency upper limit (low byte)		
81E5A8	Acceptable CNG detection frequency lower limit (high byte)	BCD (Hz)	If both addresses contain FF(H), tone detection is disabled.
81E5A9	Acceptable CNG detection upper frequency lower limit (low byte)		
81E5AA	Not used		Do not change these settings.
81E5AB	CNG on time	20 ms	Factory setting: 500 ms
81E5AC	CNG off time	20 ms	Factory setting: 200 ms
81E5AD	Number of CNG cycles required for detection		The data is coded in the same way as address 81E533. Factory setting: 23(H)
81E5AE	Not used		Do not change this setting.
81E5AF	Acceptable AI short protocol tone (800Hz) detection frequency upper limit (high byte)	BCD (Hz)	If both addresses contain FF(H), tone detection is disabled.
81E5B0	Acceptable AI short protocol tone (800Hz) detection upper frequency upper limit (low byte)		

Address	Function	Unit	Remarks
81E5B1	Acceptable AI short protocol tone (800Hz) detection frequency lower limit (high byte)	BCD (Hz)	If both addresses contain FF(H), tone detection is disabled.
81E5B2	Acceptable AI short protocol tone (800Hz) detection upper frequency lower limit (low byte)		
81E5B3	Detection time for 800 Hz AI short protocol tone	20 ms	Factory setting: 360 ms
81E5B4	PSTN: Tx level from the modem	- N - 3 (dBm)	Function 08 (parameter 01).
81E5B5	PSTN: 1100 Hz tone transmission level	- N 81E5B4 - 0.5N 81E5B5 - 3.5 (dBm)	
81E5B6	PSTN: 2100 Hz tone transmission level	- N 81E5B4 - 0.5N 81E5B6 - 3 (dBm)	
81E5B7	PABX: Tx level from the modem	- dBm	
81E5B8	PABX: 1100 Hz tone transmission level	- N 81E5B7 - 0.5N 81E5B8 (dB)	
81E5B9	PABX: 2100 Hz tone transmission level	- N 81E5B7 - 0.5N 81E5B9 (dB)	
81E5BA to 81E5BC	Not used		Do not change these settings.
81E5BD	Modem turn-on level (incoming signal detection level)	-37-0.5N (dBm)	
81E5DA	T.30 T1 timer	1 s	
81E5E0 bit 3	Maximum wait time for post message	**0:** 12 s **1:** 30 s	**1:** Maximum wait time for post message (EOP/EOM/MPS) can be changed to 30 s. Change this bit to “1” if communication errors occur frequently during V.17 reception.

NOTES

1. If you change the NCU country code and exit the service mode, the bit switch country code (System Bit Switch 0F) will automatically be changed to the same country code.
2. If a setting is unnecessary, store FF in the address.
3. In, Europe, if the country code is not specified, set it to UK (02).
4. Italy and Belgium only
   RAM address 81E55E: the lower four bits have the following meaning.
   Bit 2 1: International dial tone cadence detection enabled (Belgium)
   Bit 1 Not used
   Bit 0 1: PSTN dial tone cadence detection enabled (Italy)

   If bit 0 or bit 2 is set to 1, the functions of the following RAM addresses change.
   81E508 (if bit 0 = 1) or 81E538 (if bit 2 = 1): tolerance for on or off state duration (%), and number of cycles required for detection, coded as in address 81E533.
   81E50B (if bit 0 = 1) or 81E53B (if bit 2 = 1): on time, hex code (unit = 20 ms)
   81E50C (if bit 0 = 1) or 81E53C(if bit 2 = 1): off time, hex code (unit = 20 ms)
5. Pulse dial parameters (addresses 81E54A to 81E54F) are the values for 10 PPS. If 20 PPS is used, the machine automatically compensates.
6. The first ring may remain undetected until 1 to 2.5 wavelengths after the time specified by this parameter.
7. The calculated level must be between 0 and 10.
   The attenuation levels calculated from RAM data are:
   High frequency tone: $- 0.5 \times N_{81E552}/_{81E554}$ dBm
   Low frequency tone: $- 0.5 \times (N_{81E552}/_{81E554} + N_{81E553})$ dBm
   Note: N_{81E552}, for example, means the value stored in address 81E552(H)
8. 81E54A: Europe - Between Ds opening and Di opening, France - Between Ds closing and Di opening
   81E54D: Europe - Between Ds closing and Di closing, France - Between Ds opening and Di closing
9. The actual inter-digit pause (pulse dial mode) is the sum of the periods specified by the RAM addresses 81E54A, 81E54D, and 81E54E.

4.4 DEDICATED TRANSMISSION PARAMETERS

Each Quick Dial Key and Speed Dial Code has four bytes of programmable parameters allocated to it. If transmissions to a particular machine often experience problems, store that terminal's fax number as a Quick Dial or Speed Dial, and adjust the parameters allocated to that number.

The programming procedure will be explained first. Then, the four bytes will be described.

4.4.1 PROGRAMMING PROCEDURE

1. Set bit 3 of System Bit Switch 04 to 1.
2. Either use Function 31 (for a Quick Dial number) or Function 32 (for a Speed Dial number)

   Example: Change the Parameters in Quick Dial 10.

3. Function 3 1 Yes
4. Press the Quick Dial key 10.
   Note: When selecting Speed Dial 10 with Function 32, press 1 0 on the ten keypad.
5. Press Yes four times.
6. The settings for byte 0 are now displayed. Press a number from 0 to 7 corresponding to the bit that you wish to change.

   Example: Change bit 7 to 1: Press 7

7. To scroll through the parameter bytes, either:
   Select the next byte:
   or
   Select the previous byte:
   until the correct byte is displayed. Then go back to step 6.
8. After the setting is changed, press Yes .
9. To finish, press Function.
10. After finishing, reset bit 3 of System Bit Switch 04 to 0.

4.4.2 PARAMETERS

The initial settings of the following parameters are all FF(H) - all the parameters are disabled.

Switch 01
FUNCTION AND COMMENTS
ITU-T T1 time If the connection time to a particular terminal is longer than the NCU parameter setting, adjust this byte. The T1 time is the value stored in this byte (in hex code), multiplied by 1 second. **Range:**1 to 127 s (01h to 7Fh) 00h or FFh - The local NCU parameter factory setting is used. Do not program a value between 80h and FEh.

Switch 02		
	FUNCTION	**COMMENTS**
0 to 3	TX level **Bit 3 2 1 0 Setting (dBm)** 0 0 0 0 0 0 0 0 1 -1 : 1 1 1 1 -15	If communication with a particular remote terminal often contains errors, the signal level may be inappropriate. Adjust the TX level for communications with that terminal until the results are better.
4	TX level setting **0:** Enabled **1:** Disabled (bits 0 to 4 must all be at 1 to disable)	**0:** When enabling the TX level setting, change this bit to 0, then change the settings of bits 0 through 3 above. **1:** When disabling the TX level setting, change all of the bits 0 through 4 to 1.
5 6	Cable equalizer **Bit 6 Bit 5 Setting** 0 0 None 0 1 Low 1 0 Medium 1 1 High	Use a higher setting if there is signal loss at higher frequencies because of the length of wire between the modem and the telephone exchange when calling the number stored in this Quick/Speed Dial. Also, try using the cable equalizer if one or more of the following symptoms occurs. • Communication error with error codes such as 0-20, 0-23, etc. • Modem rate fallback occurs frequently.
7	Cable equalizer setting **0:** Enabled **1:** Disabled (bits 5 to 7 must all be at 1 to disable)	**0:** When enabling the cable equalizer setting, change this bit to 0, then change the settings of bits 5 and 6 above. **1:** When disabling the cable equalizer setting, change all of the bits 5, 6 and 7 to 1.

Switch 03		
	FUNCTION	**COMMENTS**
0 to 3	Initial TX modem rate **Bit 3 2 1 0 Setting (bps)** 0 0 0 0 Not used 0 0 0 1 2,400 0 0 1 0 4,800 0 0 1 1 7,200 0 1 0 0 9,600 0 1 0 1 12 000 0 1 1 0 14,400 : 1 1 0 1 31,200 1 1 1 0 33,600 1 1 1 1 Setting disabled	If training with a particular remote terminal always takes too long, the initial modem rate may be too high. Reduce the initial TX modem rate using these bits.
4-5	Not used	Do not change these settings.
6	AI short protocol **0:** Disabled **1:** Enabled	**0:** AI short protocol is disabled for transmission
7	Not used	Do not change these settings.

Switch 04		
	FUNCTION	**COMMENTS**
0 **1**	mm-inch conversion before tx **Bit 1 Bit 0 Setting** 0 0 mm-inch conversion available 0 1 mm only 1 0 Not used 1 1 Disabled	The machine uses inch-based resolutions for scanning. If ”inch only” is selected, the printed copy may be slightly distorted at the other end if that machine uses mm-based resolutions.
2 **3**	DIS/NSF detection method **Bit 3 Bit 2 Setting** 0 0 First DIS or NSF 0 1 Second DIS or NSF 1 0 First DIS or NSF 1 1 Setting disabled	**(0, 1):** Use this setting if echoes on the line are interfering with the set-up protocol at the start of transmission. The machine will then wait for the second DIS or NSF before sending DCS or NSS.
4	V.8 protocol **0:** Disabled **1:** Enabled	If transmissions to a specific destination always end at a low modem rate (lower than 14,400 bps), disable V.8 protocol so that V.34 protocol will not be used. **0:** V.34 communication will not be possible.
5	Compression modes available in transmit mode **0:** MH only **1:** All available compression modes	This bit determines the capabilities that are informed to the other terminal during transmission.

6 **7**	ECM during transmission **Bit 7 Bit 6 Setting** 0 0 Disabled 0 1 Enabled 1 0 Disabled 1 1 Setting disabled	For example, if ECM is switched on but is not wanted when sending to a particular terminal, use the (0, 0) setting.

Switches 05to 08 - Not used (do not change the settings)

Switch 09 (Optional ISDN G4 unit required)		
	FUNCTION	**COMMENTS**
0 to 3	Layer 3 protocol **Bits 3 2 1 0 Setting** 0 0 0 0 ISO 8208 0 0 0 1 T.70 NULL 1 1 1 1 Disabled	When disabled, the setting of G4 parameter switch 6 (bit 0) setting is used.
4-7	Not used	Do not change the settings.

Switch 10 (Optional ISDN G4 unit required)		
	FUNCTION	**COMMENTS**
0	Attachment of the Higher Layer Capabilities **0:** Yes **1:** No	This bit determines whether Higher Layer Capabilities are informed in the [SETUP] signal or not.
1	Not used	Do not change the settings.
2	ISDN G3 information transfer capability **0:** 3.1 kHz audio **1:** Speech	In tx mode, this determines the information transfer capability informed in the [SETUP] message. In rx mode, this determines the information transfer capability that the machine can use to receive a call. Set this bit to 1 if the ISDN does not support 3.1 kHz audio.
3-7	Not used	Do not change the settings.

4.5 SERVICE RAM ADDRESSES

⚠CAUTION
Do not change settings marked as "Not used" or "Read only."

800001 to 800004(H) - ROM version (Read only)

800001(H) - Revision number (BCD)
800002(H) - Year (BCD)
800003(H) - Month (BCD)
800004(H) - Day (BCD)

800005(H) - RAM Reset Level 1

Change the data at this address to FF (H), then switch the machine off and on to reset all the system settings.
Caution: Before using this RAM, print the settings of all the system parameters (System Parameter List).

NOTE: The country code will be reset to UK when RAM reset level 1 is done.

800006 to 800016(H) - Machine's serial number (17 digits - ASCII)

800018(H) - Total program checksum (low)
800019(H) - Total program checksum (high)

80001A(H) - Boot program checksum (low)
80001B(H) - Boot program checksum (high)

80001C(H) - Main program checksum (low)
80001D(H) - Main program checksum (high)

80001E(H) - RDS program update counter (hex)

800020 to 80003F(H) - System bit switches
800040 to 80004F(H) - Scanner bit switches
800050 to 80005F(H) - Printer bit switches
800060 to 80007F(H) - Communication bit switches
800080 to 80008F(H) - G3 bit switches

8000A0(H) - User parameter switch 00

Bit 0: Stamp home position 0: Disabled, 1: Enabled
Bit 1 to 3: Not used
Bits 4 and 5: Scanning resolution home position

Bit	5	4	Setting
	0	0	Standard
	0	1	Detail
	1	0	Fine
	1	1	Halftone

Bit 6: Transmission mode home position 0: Memory TX, 1: Immediate TX
Bit 7: Not used

8000A1(H) - User parameter switch 01

Bits 0 to 6: Not used
Bit 7: Settings return to home position after transmission 0: Disabled, 1: Enabled

8000A2(H) - User parameter switch 02
Bit 0: Forwarding mark printing on forwarded messages 0: Disabled, 1: Enabled
Bit 1: Center mark printing on received copies 0: Disabled, 1: Enabled
Bit 2: Reception time printing 0: Disabled, 1: Enabled
Bit 3: TSI included in transmitted messages 0: Disabled, 1: Enabled
Bit 4: Checkered mark printing 0: Disabled, 1: Enabled
Bit 5: CIL printing (G4) 0: Disabled, 1: Enabled
Bit 6: TID printing (G4) 0: Disabled, 1: Enabled
Bit 7: Not used

8000A3(H) - User parameter switch 03 (Automatic report printout)
Bit 0: Transmission result report (memory transmissions) 0: Off, 1: On
Bit 1: Not used
Bit 2: Memory storage report 0: Off, 1: On
Bit 3: Polling reserve report (polling reception) 0: Off, 1: On
Bit 4: Polling result report (polling reception) 0: Off, 1: On
Bit 5: Transmission result report (immediate transmissions) 0: Off, 1: On
Bit 6: Polling clear report 0: Off, 1: On
Bit 7: Journal 0: Off, 1: On

8000A4(H) - User parameter switch 04
Bit 0: Confidential reception report 0: Off, 1: On
Bits 1 to 6: Not used
Bit 7: Includes a sample image on reports 0: Off, 1: On

8000A5(H) - User parameter switch 05
Bit 0: Substitute reception 0: Off, 1: On
Bit 1: Memory reception if no RTI or CSI received 0: Possible, 1: Impossible
Bits 2 to 5: Not used
Bit 6: Fusing lamp control during energy saver mode
0: Lamp off, 1: Standby temperature
Bit 7: Not used (keep this bit at 0.)

8000A6(H) - User parameter switch 06
Bit 0: TTI 0: Off, 1: On
Bit 1: Not used
Bit 2: Closed network for transmission 0: Off, 1: On
Bit 3: Not used
Bit 4: Batch transmission 0: Off, 1: On
Bit 5: Not used
Bit 6: ISDN SPID programming (used only in the USA) 0: Off, 1: On
Bit 7: Not used

8000A7(H) - User parameter switch 07
Bits 0 to 1: Not used
Bit 2: Parallel memory transmission 0: Off, 1: On
Bit 3: Not used
Bit 4: Use of ∗ key for tonal signals 0: Off, 1: On
Bits 5 to 7: Not used

8000A8(H) - User parameter switch 08

Bits 0 and 1: Multi-copy reception

Bit 1	0	Setting
X	0	Disabled
0	1	Faxes from senders whose RTIs/CSIs are specified for this feature are multicopied.
1	1	Faxes from senders whose RTIs/CSIs are not specified for this feature are multicopied.

Bits 2 and 3: Authorized reception

Bit 3	2	Setting
X	0	Disabled
0	1	Faxes from senders whose RTIs/CSIs are specified for this feature are accepted.
1	1	Faxes from senders whose RTIs/CSIs are not specified for this feature are accepted.

Bits 4 and 5: Specified cassette selection (optional cassette required)

Bit 5	4	Setting
X	0	Disabled
0	1	Faxes from senders whose RTIs/CSIs are specified for this feature are printed to the paper in a specified cassette.
1	1	Faxes from senders whose RTIs/CSIs are not specified for this feature are printed to the paper in a specified cassette.

Bits 6 and 7: Forwarding (optional memory card required)

Bit 7	6	Setting
X	0	Disabled
0	1	Faxes from senders whose RTIs/CSIs are specified for this feature are forwarded.
1	1	Faxes from senders whose RTIs/CSIs are not specified for this feature are forwarded.

8000A9(H) - User parameter switch 09

Bits 0 and 1: Memory lock

Bit 1	0	Setting
X	0	Disabled
0	1	Faxes from senders whose RTIs/CSIs are specified for this feature are kept in the memory until a memory lock ID is entered.
1	1	Faxes from senders whose RTIs/CSIs are not specified for this feature are kept in the memory until a memory lock ID is entered.

Bits 2 to 7: Not used

8000AA(H) - User parameter switch 10 (SWusr_0A)

Bit 0: Reverse order printing 0: Disabled, 1: Enabled
Bit 1: 2 in 1 0: Disabled, 1: Enabled
Bits 2 to 6: Not used
Bit 7: Halftone type 0: Error diffusion, 1: Dither

8000AB(H) - User parameter switch 11 (SWusr_0B)

Bit 0: Not used

Bit 1: Method of transmitting numbers after the "Tone" mark over an ISDN line
0: UUI, 1: Tone

Bit 2: Blank sheet detection 0: Disabled, 1: Enabled

Bits 3 to 5: Not used

Bit 6: Printout of messages received while acting as a forwarding station
0: Off, 1: On

Bit 7: Polling Standby duration 0: Once, 1: No limit

8000AC(H) - User parameter switch 12 (SWusr_0C)

Bit 0 to 6: Not used

Bit 7: Copy operation 0: Possible, 1: Prohibited

8000AD(H) - User parameter switch 13 (SWusr_0D)

Bits 0 and 1: PSTN access method from behind a PABX

Bit 1	0	Setting
0	0	PSTN
0	1	Loop start
1	0	Ground start
1	1	Flash start

Bit 1: Receive message in the memory when the machine is set as PC direct reception and the PC does not receive the message
0: Do not receive in the memory
1: Receive in the memory

Bits 2 to 5: Not used

Bit 6: Action when the received Higher Layer Capabilities is Tel or Bearer Capabilities is Speech
(This switch is not listed on the User Parameter List.)
0: Do not respond to the call
1: Respond to the call

Bit 7: Not used

8000AE(H) – User parameter switch 14 (SWusr_0E)

Bit 0: Transmission method 0: Direct 1: Memory

Bit 1: To print received messages (normal fax reception) if the PC does not respond in the PC direct reception mode
0: Do not print the message
1: Print the message when the number of rings exceeds the counter

Bit 2: TTI included in memory transmission (when bit 0 is set to “1”)
0: Disabled 1: Enabled

Bit 3 and 4: Destination for reception

Bit 4	3	Destination
0	0	Print from the machine (normal fax reception)
0	1	PC direct reception
1	0	PC memory reception
1	1	PC memory reception and print from the machine

Bit 5 and 6: PC Fax application type

Bit 6	5	Application type
0	0	Bitware/ MS Fax (Win 95)
0	1	WinFax 4.0/7.0/8.0
1	0	Not used
1	1	Sopwith/ LaserFax

Bit 7: Not used

8000B9(H) - User function 63 settings (SWusr_19)

Bit 0: Night timer 0: Disabled, 1: Enabled
Bits 1 to 3: Not used
Bit 4: RDS operation 0: Not acceptable
1: Acceptable for the limit specified by system switch 03
Bits 5 and 6: Not used
Bit 7: Daylight saving time 0: Disabled, 1: Enabled

8000BA(H) - User function 63 setting (SWusr_1A)

Bit 0: Not used
Bit 1: Dialing type 0: Pulse dialing (10 PPS), 1: Tone (DTMF) dialing
Bits 2 to 7: Not used

8000BB(H) - PSTN access number for loop start (SWusr_1B)

Access number	Hex value to program (BCD)
0 ⇩	F0 ⇩
0	F0
00 ⇩	00 ⇩
99	99

8000BF(H) - User function 63 setting (SWusr_1F)

Bit 0: PC fax reception 0: Disabled, 1: Enabled
Bit 1 to 7: Not used

8000C0 to 8000CF(H) - G4 Parameter switches
8000D0 to 8000EF(H) - G4 Internal switches

8000F0 to 800103(H) - RTI (Max. 20 characters - ASCII) - **See the following note**
800104 to 800117(H) - CSI (Max. 20 characters - ASCII)
800118 to 80012B(H) - ISDN G3 CSI (Max. 20 characters - ASCII)
80012C to 80014B(H) - TTI (Max. 32 characters - ASCII) - **See the following note**
80014C(H) - Number of CSI characters (Hex)
80014D(H) - Number of ISDN G3 CSI characters (Hex)

Note: If the number of characters are less than the maximum (20 for RTI, 32 for TTI), add a stop code (FF[H]) after the last character.

80014E to 80015C(H) - Service station's fax number (Service function 13)

80016C to 80017A(H) - Own fax number (PSTN) (User function 61)
80017B to 800189(H) - Own fax number (ISDN G4) (User function 61)
80018A to 800198(H) - ISDN G3 Subscriber Number 1 (User function 64)

800199 to 8001A7(H) - ISDN G3 Subscriber Number 2 (User function 64)
8001A8 to 8001B6(H) - G4 Subscriber Number 1 (User function 64)
8001B7 to 8001C5(H) - G4 Subscriber Number 2 (User function 64)

8001C6(H) - ID code (low - BCD)
8001C7(H) - ID code (high - BCD)

8001C8(H) - Confidential ID (low - BCD)
8001C9(H) - Confidential ID (high - BCD)

8001CA(H) - Memory lock ID (low - BCD)
8001CB(H) - Memory lock ID (high - BCD)

8001CE(H) - Remote ID (low - BCD)
8001CF(H) - Remote ID (high - BCD)

8001D0(H) - Network type used for the service station number
00(H) - G3 (PSTN)
01(H) - G4 (ISDN)

8001D8 to 8001DF(H) - Last power off time (Read only)
8001D8(H) - Clock
00(H) - 12-hour clock (AM)
01(H) - 24-hour clock
02(H) - 12-hour clock (PM)
8001D9(H) - Year (BCD)
8001DA(H) - Month (BCD)
8001DB(H) - Day (BCD)
8001DC(H) - Hour
8001DD(H) - Minute
8001DE(H) - Second
8001DF(H) - 00: Monday, 01: Tuesday, 02: Wednesday, ... , 06: Sunday

8001EC(H) - Optional equipment (Read only)
Bit 0 to 2: Not used
Bit 3: G4 unit
Bit 4: Multi-purpose feeder
Bit 5: Paper feed unit
Bit 6 and 7: Not used

The following counters are on the System Parameter List. The names used on the system parameter list are in brackets.

8001F6 to 8001F9(H) - TX counter (TX)

Address	High	Low
8001F6(H)	Tens digit	Unit digit
8001F7(H)	Thousands digit	Hundreds digit
8001F8(H)	Hundred thousands digit	Ten thousands digit
8001F9(H)	Ten millions digit	Millions digit

Note: The following counters have the same data format as above.

8001FA to 8001FD(H) - RX counter (RX)

8001FE to 800201(H) - Scan counter (SCN)

800202 to 800205(H) - Print counter (PRT)

80020A to 80020D(H) - Paper feed counter: standard cassette (MAIN)

80020E to 800211(H) - Paper feed counter: optional paper feed (2ND)

800212 to 800215(H) - Paper feed counter: optional multi-purpose feeder (MULTIPURPOSE)

80021E to 800221(H) - ADF counter

800226 to 800229(H) - Printer total jam counter (COPY JAM)

80022A to 80022D(H) - Paper jam counter: standard cassette (MAIN CST JAM)

80022E to 800231(H) - Paper jam counter: optional paper feed (2ND CST JAM)

800232 to 800235(H) - Paper jam counter: optional multi-purpose feeder (OPEN CST JAM)

80023A to 80023D(H) - Scanner total jam counter (DOC. JAM)

80023E to 800241(H) - Fusing exit jam counter (EJECT JAM)

800242 to 800245(H) - Registration jam counter (PAPER JAM)

80024A to 80024D(H) - PM counter (PM)

80024E to 800251(H) - PM call interval: default 60,000 (PM DEFAULT)

800266 to 800269(H) - PC TX counter (PC TX)

80026A to 80026D(H) - PC RX counter (PC RX)

80026E to 800271(H) - PC scan counter (PC SCN)

800272 to 800275(H) - PC print counter (PC PRT)

8002AB to 8002BA(H) - Excessive jam call parameters

Parameters		Address (H)		Initial Setting	Sys. Para. List
		ADF	Printer		
DEC (1 - 255; 0 = Disabled)		8002B3	8002B7	10 (H)	X
CALL (3 – 15; 0 = Disabled)		8002B4	8002B8	06(H)	Y
CLR	(Low)	8002B5	8002B9	30(H)	-
	(High)	8002B6	8002BA	00(H)	

Counters	Address (H)		Sys. Para. List
	ADF	Printer	
JAM: Jam counter used to place a service call	8002AB	8002AF	Z
NO-JAM1: Counter used for JAM counter decrement	8002AC	8002B0	-
NO-JAM2: Counter used for clearing the JAM counter	8002AD (Low)	8002B1 (Low)	-
	8002AE (High)	8002B2 (High)	

8002C0 to 8002CB(H) - G4 NSC code

8002CC to 8002E3(H) - G4 terminal ID (ASCII - Max. 24 characters)

8002E4 to 8002E7(H) - ISDN IP

8002E8 to 8002EB(H) - ISDN G3 sub-address

8002EC to 8002EF(H) - ISDN G4 sub-address

8002F0(H) - SiG4 board ROM Suffix
8002F1(H) - SiG4 ROM Version
8002F2 to 8002F4(H) - SiG4 ROM Information
8002F2(H) - Year (BCD)
8002F3(H) - Month (BCD)
8002F4(H) - Day (BCD)

8002F5 to 8002F6(H) - Modem ROM version (FCU)

8002FE to 800327(H) - Night timer period (User function 71)
8002FE to 800300(H) - Setting #1 for Monday
800301 to 800303(H) - Setting #2 for Monday
800304 to 800306(H) - Setting #1 for Tuesday
800307 to 800309(H) - Setting #2 for Tuesday
80030A to 80030C(H) - Setting #1 for Wednesday
80030D to 80030F(H) - Setting #2 for Wednesday
800310 to 800312(H) - Setting #1 for Thursday
800313 to 800315(H) - Setting #2 for Thursday
800316 to 800318(H) - Setting #1 for Friday
800319 to 80031B(H) - Setting #2 for Friday
80031C to 80031E(H) - Setting #1 for Saturday
80031F to 800321(H) - Setting #2 for Saturday
800322 to 800324(H) - Setting #1 for Sunday
800325 to 800327(H) - Setting #2 for Sunday

Program format
First byte - Hour (BCD)
Second byte - Minute (BCD)
Third byte - 00(H): Timer start time, 01(H): Timer end time

800352 to 800359(H) - Last RDS operation (Read only)
800352(H) - Clock
00(H): 12-hour clock (AM)
01(H): 24-hour clock
02(H): 12-hour clock (PM)
800353(H) - Year (BCD)
800354(H) - Month (BCD)
800355(H) - Day (BCD)
800356(H) - 00: Monday, 01: Tuesday, 02: Wednesday, ... , 06: Sunday
800357(H) - Hour
800358(H) - Minute
800359(H) - Second

800362(H) - Daylight savings time setting (User function 62)

800365(H) - Transmission monitor volume 00 - 07(H)
800366(H) - Reception monitor volume 00 - 07(H)
800367(H) - On-hook monitor volume 00 - 07(H)
800368(H) - Dial monitor volume 00 - 07(H)
800369(H) - Buzzer volume 00 - 07(H)
80036A(H) - Key acknowledgment tone volume 00 - 07(H)

80036B to 80036F(H) - Periodic service call parameters

Parameters		Address (H)
Call interval: 01 through 15 month(s) (BCD) 00: Periodic service call disabled		**80036B**
Date and time of the next call	Day: 01 through 31 (BCD)	**80036E**
	Hour: 01 through 24 (BCD)	**80036F**

800376 to 800378(H) - Effective term of automatic service calls

Parameters	Address (H)
Year: last two digits of the year (BCD)	**800376**
Month: 01 through 12 (BCD)	**800377**
Day: 01 through 31 (BCD)	**800378**

800379 to 80037A(H) - **MODEM version (Read only)**
800379(H) - Low (hex)
80037A(H) - High (hex)

8002B6 to 8002B7(H) - Scanning top margin adjustment
8002B8 to 8002B9 (H) - Scanning bottom margin adjustment
Refer to section 6.12 for details.

800438(H) - Excessive jam alarm
Bit 3: Scanner excessive jam alarm 1: An alarm has occurred
Bit 4: Printer excessive jam alarm 1: An alarm has occurred
Either or both of these bits will change to 1 when an excessive jam alarm occurs. Reset each bit to 0 when you have solved the problem. The machine will not be able to detect excessive jams in future if you do not reset these bits.

800449(H) - Print top margin (standard cassette: factory mode)
80044A(H) - Print top margin (optional paper feed unit: factory mode)
80044E(H) - Print top margin (optional multi-purpose feeder: factory mode)

800455(H) - Print left margin (standard cassette: factory mode)
800456(H) - Print left margin (optional paper feed unit: factory mode)
80045A(H) - Print left margin (optional multi-purpose feeder: factory mode)

80045F(H) - Print top margin (standard cassette: user function mode)
800460(H) - Print top margin (optional paper feed unit: user function mode)
800464(H) - Print top margin (optional multi-purpose feeder: user function mode)

800468(H) - Print left margin (standard cassette: user function mode)
800469(H) - Print left margin (optional paper feed unit: user function mode)
80046D(H) - Print left margin (optional multi-purpose feeder: user function mode)

Refer to section 6.12 for details about these parameters.

8004B1(H) - Details of the service call (hardware error)
0X(H): Fusing unit failure
21(H): Laser power is out of the specified range
3X(H): Polygonal mirror motor failure
5X(H): Power pack failure

When a service call was caused by a fusing lamp failure (codes 0X):
After fixing the problem, set printer switch 01 bit 0 to 1 and turn the power off/on. The machine resets this bit to 0, and restarts the machine to clear the service call.

When a service call occurred because of a different hardware failure:
If the problem remains after restarting the machine (power off/on), fix the hardware problem. The service call condition clears after power up.

808609 to 808D10(H) - Latest 20 error communication records

One error communication record consists of 90 bytes. The format is as follows:

1st byte - Header
Bit 0: Communication result 0: OK, 1: NG
Bit 1: Document jam 1: Occurred
Bit 2: Power down 1: Occurred
Bit 3: Not used
Bit 4: Technical data printout instead of personal codes 0: No, 1: Yes
Bit 5: Type of technical data 0: Rx level, 1: Measure of error rate
Bit 6: Error report 0: Not printed, 1: Printed
Bit 7: Data validity 0: Not valid, 1: Valid

2nd byte - Not used

3rd to 7th bytes - Date and time when the communication started
3rd byte - Year (BCD)
4th byte - Month (BCD)
5th byte - Day (BCD)
6th byte - Hour (BCD)
7th byte - Minute (BCD)
8th and 9th bytes - Communication time
8th byte - Minutes (BCD)
9th byte - Seconds (BCD)

10th byte - Not used

11th and 12th bytes - Number of pages transmitted or received
11th byte - Low byte (Hex)
12th byte - High byte (Hex)

13th and 14th bytes - Personal code or number of total/burst error lines
If bit 4 of the 1st byte is 0: 13th byte - Personal code (low - BCD)
14th byte - Personal code (high - BCD)
If bit 4 of the 1st byte is 1: 13th byte - Number of total error lines (Hex)
14th byte - Number of burst error lines (Hex)

15th byte - File number (low - Hex)
16th byte - File number (high - Hex)

17th and 18th bytes - Rx level or measure of error rate
If bit 5 of the 1st byte is 0: 17th byte - Rx level (low - Hex)
18th byte - Rx level (high - Hex)
If bit 4 of the 1st byte is 1: 17th byte - Measure of error rate (low - Hex)
18th byte - Measure of error rate (high - Hex)

19th byte - Final modem rate

Bits 0 to 3: Final modem speed

Bit 3	2	1	0	Setting
0	0	0	1	2.4 k
0	0	1	0	4.8k
0	0	1	1	7.2k
0	1	0	0	9.6k
0	1	0	1	12.0k
0	1	1	0	14.4k
0	1	1	1	16.8k
1	0	0	0	19.2k
1	0	0	1	21.6k
1	0	1	0	24.0k
1	0	1	1	26.4k
1	1	0	0	28.8k
1	1	0	1	31.2
1	1	1	0	33.6k

Other settings - Not used

Bits 4 to 7: Final modem type

Bit 7	6	5	4	Setting
0	0	0	1	V.27ter
0	0	1	0	V.27ter, V.29
0	0	1	1	Not used
0	1	0	0	V.27ter, V.29, V.17
0	1	0	1	V.27ter, V29, V.17, V.34

Other settings - Not used

20th to 22nd byte - Not used

23rd to 46th byte - Remote terminal's ID (RTI, TSI or CSI) (ASCII)

47th byte - Communication mode #1

Bits 0 - 1: Resolution used

Bit 1	0	Setting
0	0	Standard
1	0	Detail
1	1	Fine

Bit 2: Communication Protocol 0: G3, 1: G4

Bit 3: ECM 0: Off, 1: On

Bits 4 to 7: Communication mode used

Bit 7	6	5	4	Setting
0	0	0	0	Normal
0	0	0	1	Confidential
0	0	1	0	Polling
0	0	1	1	Transfer
0	1	0	0	Forwarding
0	1	0	1	Automatic Service Call

0 1 1 1 Transfer using DTMF/UUI
1 0 0 0 Fax On Demand

48th byte - Communication mode #2

Bit 0: Tx or Rx 0: Tx, 1: Rx
Bit 1: Reduction in Tx 0: Not reduced, 1: Reduced
Bit 2: Batch transmission 0: Not used, 1: Used
Bit 3: Send later transmission 0: Not used, 1: Used
Bit 4: Transmission from 0: ADF, 1: Memory
Bit 5: Not used
Bits 6 and 7: Network type used

49th byte - Not used

50th byte - Number of errors during communication (Hex)

51st to 90th byte - 1st error code and page number where the error occurred
51st byte - Page number where the error occurred (low - Hex)
52nd byte - Page number where the error occurred (high - Hex)
53rd byte - Error code (low - BCD)
54th byte - Error code (high - BCD)
55th to 58th byte - 2nd error code and page number where the error occurred
59th to 62nd byte - 3rd error code and page number where the error occurred
63rd to 66th byte - 4th error code and page number where the error occurred
67th to 70th byte - 5th error code and page number where the error occurred
71st to 74th byte - 6th error code and page number where the error occurred
75th to 78th byte - 7th error code and page number where the error occurred
79th to 82nd byte - 8th error code and page number where the error occurred
83rd to 86th byte - 9th error code and page number where the error occurred
87th to 90th byte - 10th error code and page number where the error occurred

80A3A7 to 80A5A6(H) - Latest 64 error codes (Read only)

One error record consists of 8 bytes of data.

First error record start address - 80A3A7(H)
Second error record start address - 80A3AF(H)
Third error record start address - 80A3B7(H)
: : :
64th error record start address - 80A59F(H)

The format is as follows:
1st byte - Minute (BCD)
2nd byte - Hour (BCD)
3rd byte - Day (BCD)
4th byte - Month (BCD)
5th byte - Error code (low) [If the error code is 1-23, 23 is stored here.
6th byte - Error code (high) [If the error code is 1-23, 01 is stored here.
7th byte - Communication line used
00(H): PSTN, 0C(H): ISDN G3, 0D(H): ISDN G4

81185A to 812899(H) - Dedicated tx parameters for Quick Dial 01 - 30 and Speed Dial #00 - #99.
Each set of destination data consists of 32 bytes. Last 8bytes (23rd to 32nd bytes) are used.

811870 to 811879(H) - Dedicated tx parameters for Quick 01
811890 to 811899(H) - Dedicated tx parameters for Quick 02
8118B0 to 8118B9(H) - Dedicated tx parameters for Quick 03
:
811C10 to 811C19D(H) - Dedicated tx parameters for Quick 30
811C30 to 811C39(H) - Dedicated tx parameters for Speed #00
811C50 to 811C59(H) - Dedicated tx parameters for Speed #01
811C70 to 811C79(H) - Dedicated tx parameters for Speed #03
:
812890 to 812899(H) - Dedicated tx parameters for Speed #99

F396BD to F396C4(H) - ROM part number and suffix (ASCII)

5. PREVENTIVE MAINTENANCE

5.1 SPECIAL TOOLS AND LUBRICANTS

- Flash/SRAM data copy tool (P/N: H5479352)
- Flash ROM Memory Card (P/N: A2309352)

5.2 PM TABLE

Scanner / ADF **C: Clean, R: Replace**

Item	30K	60K	90K	Notes
CIS Glass	C (user)	C	C (user)	Soft cloth and water
White Roller	C (user)	C	C (user)	Soft cloth and water
ADF Feed Roller Assembly	C (user)	R	C (user)	Soft cloth and water
ADF Separation Roller	C (user)	R	C (user)	Soft cloth and water

Printer

Item	30K	60K	90K	Notes
Paper Feed Roller	C (user)	C	C (user)	Soft cloth and water
Separation Pad	C (user)	R	C (user)	Soft cloth and water
Fusing Thermistor		R		
Hot Roller Strippers		R		4 pieces used
Hot Roller		R		
Pressure Roller (Fusing)		R		
Transfer Roller		R		
Cleaning Pad	R (user) Replaced after installing a new cartridge.			A cleaning pad is included with the cartridge.

Paper Feed Unit (Optional)

Item	30K	60K	90K	Notes
Feed Roller	C (user)	C	C (user)	Soft cloth and water
Friction Pad	C (user)	R	C (user)	Soft cloth and water

Multi-purpose Feeder (Optional)

Item	30K	Notes
Feed Roller	C (user)	Soft cloth and water
Friction Pad	C (user)	Soft cloth and water

NOTE: Machine life of the Multi-purpose feeder is 60K.

6. REPLACEMENT AND ADJUSTMENT

⚠WARNING

The machine contains a laser beam generator. Laser beams can cause permanent eye damage. Do not open the laser unit or look along the laser beam path while the main power is on.

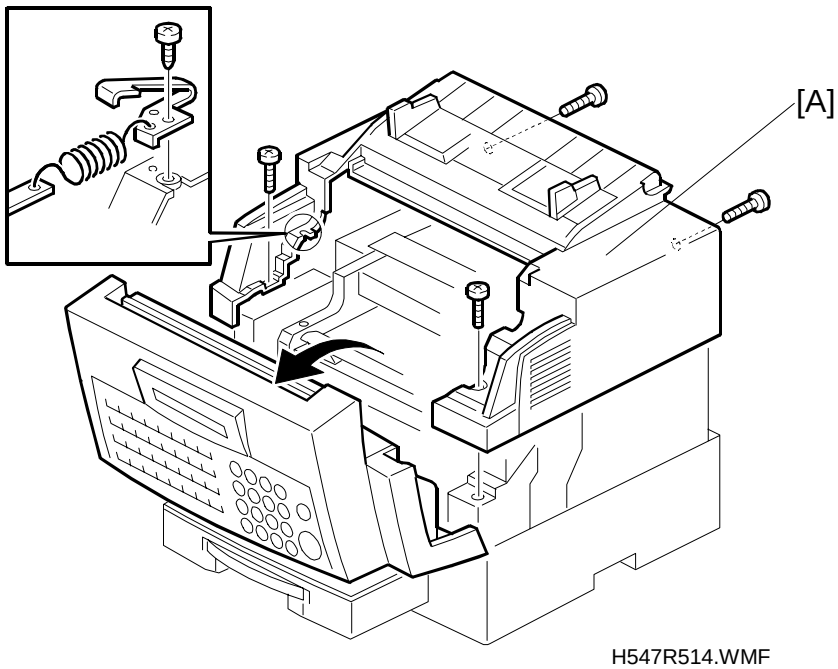
⚠CAUTION

Before starting disassembly, be sure to print all message files in the SAF memory. Then, turn off the main switch and disconnect the power cord for safety.

Lithium Battery: The danger of explosion exists if a battery of this type is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries in accordance with the manufacturer's instructions.

6.1 EXTERIOR

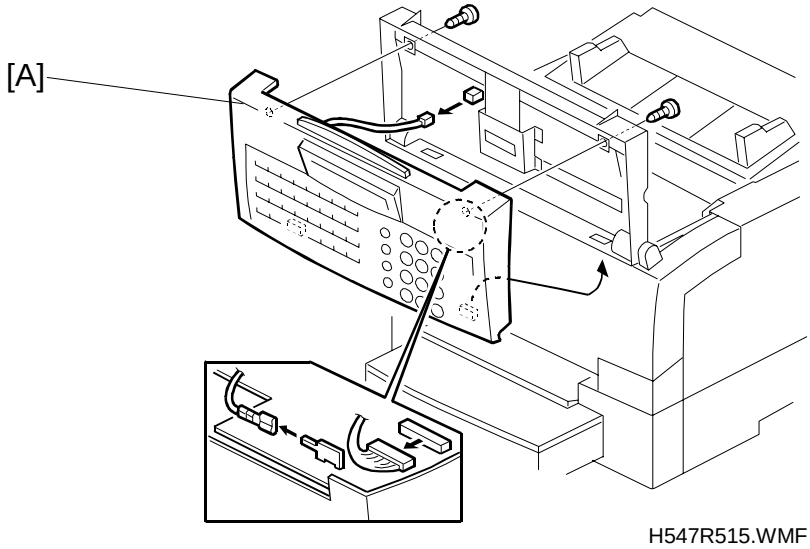
6.1.1 TOP COVER



H547R514.WMF

A: Top Cover (5 screws, 1 spring plate)

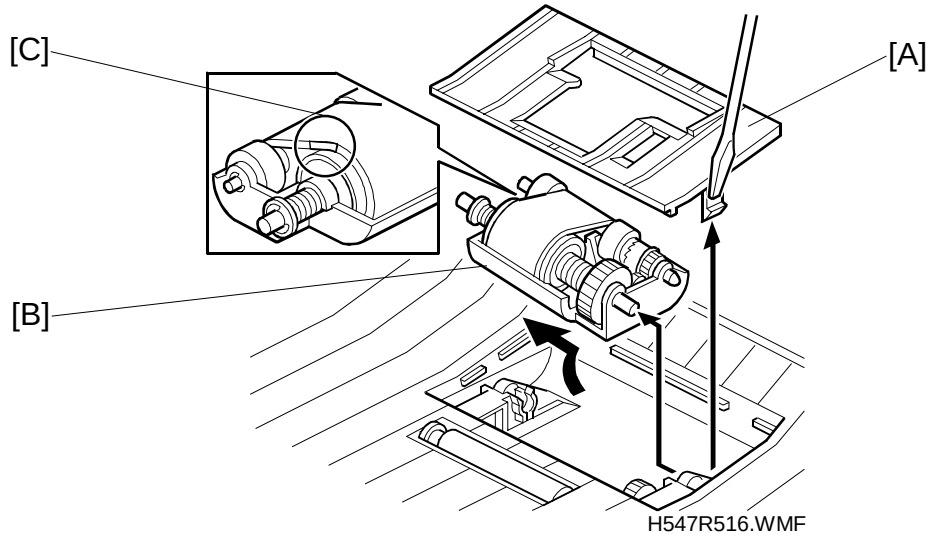
6.1.2 OPERATION PANEL



A: Operation Panel (2 screws, 2 connectors, 1 grounding wire, and 2 hooks)

6.2 ADF

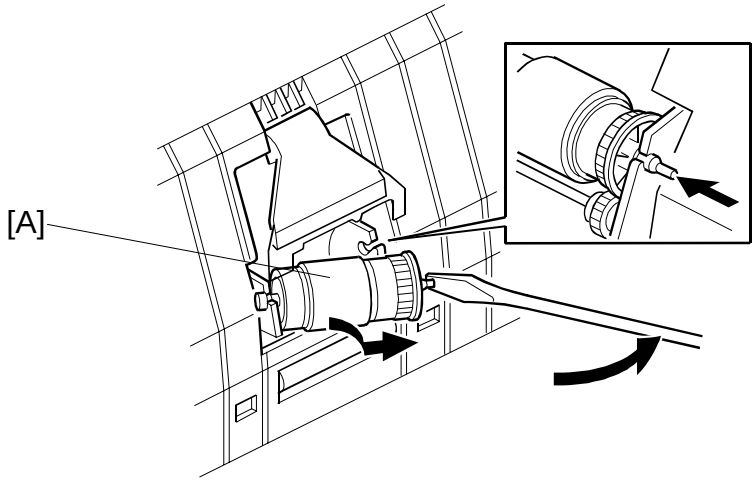
6.2.1 FEED ROLLER ASSEMBLY



A: ADF Roller Cover (2 hooks)
B: Feed Roller Assembly

NOTE: If installing a feed belt [C], be sure that the side with the white paint faces the correct direction, as shown.

6.2.2 SEPARATION ROLLER

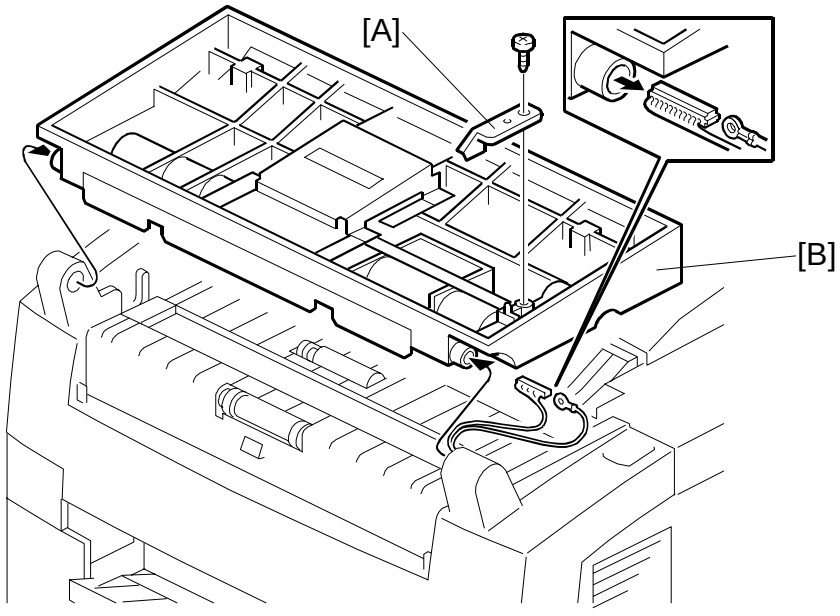


H547R517.WMF

A: Separation Roller

6.3 SCANNER

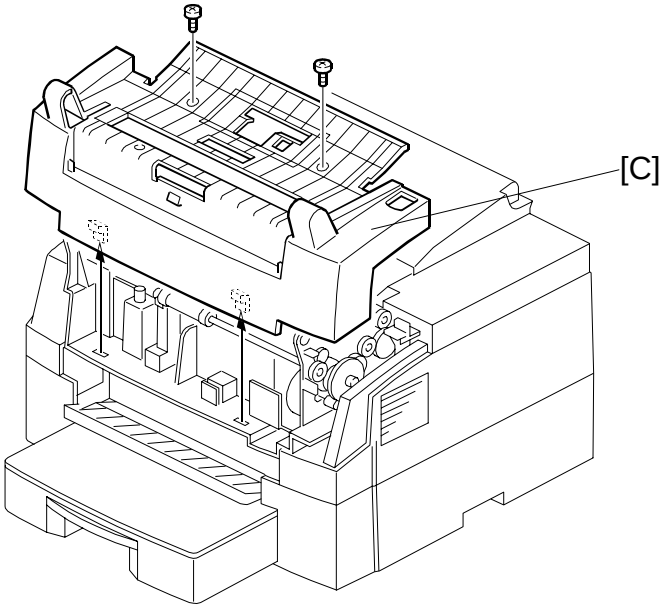
6.3.1 SCANNER UNIT DISASSEMBLY



H547R518.WMF

First, remove the top cover and the operation panel.

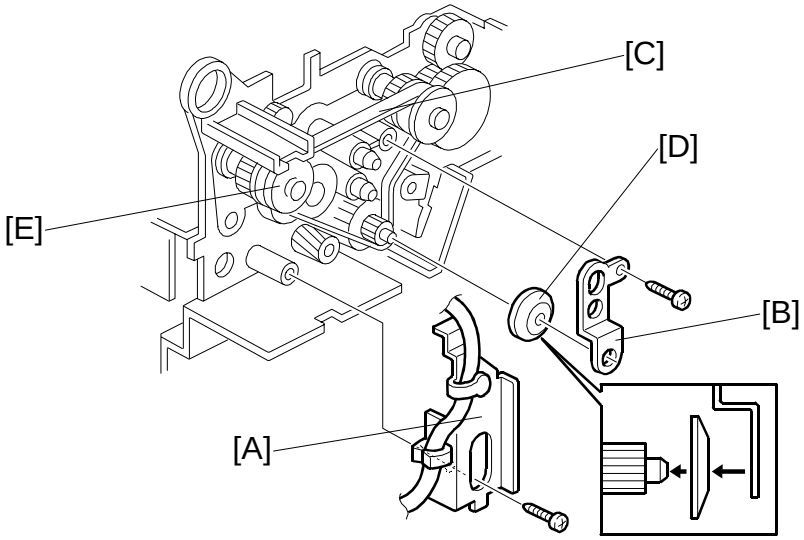
A: Stopper (1 screw)
B: ADF Upper Unit (1 screw with grounding wire)



H547R519.WMF

C: Scanner Cover (2 screws, 2 hooks)

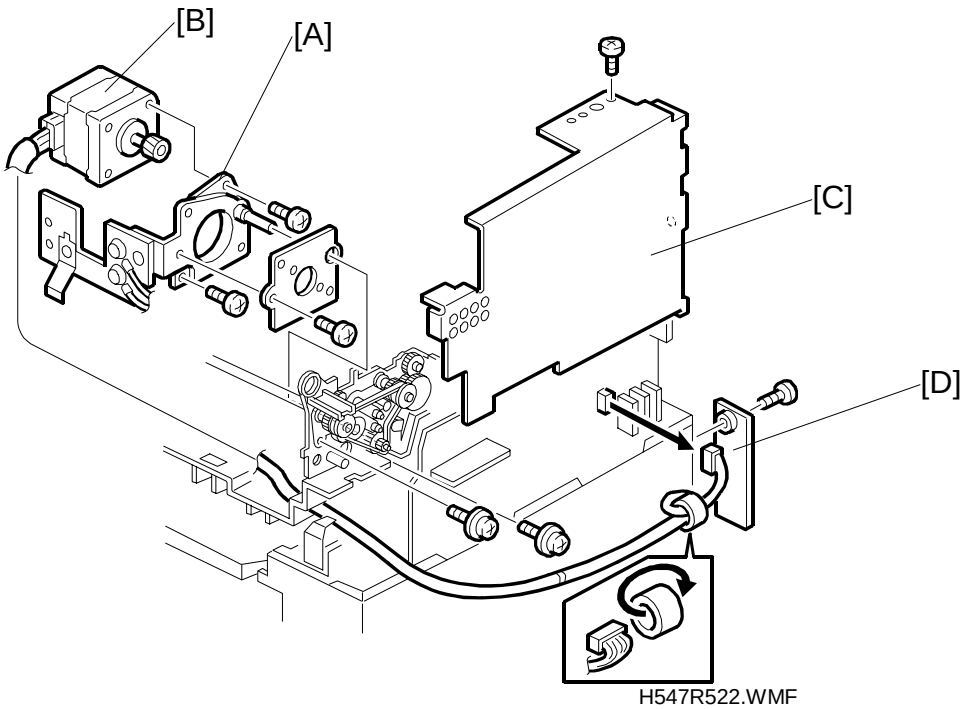
6.3.2 SCANNER MOTOR



H547R550.WMF

A: Harness Holder (1 screw)
B: Scanner Belt Bracket (1 screw, 1 belt stopper [D])
C: Scanner Belt (1 E-ring, 1 belt stopper [E])

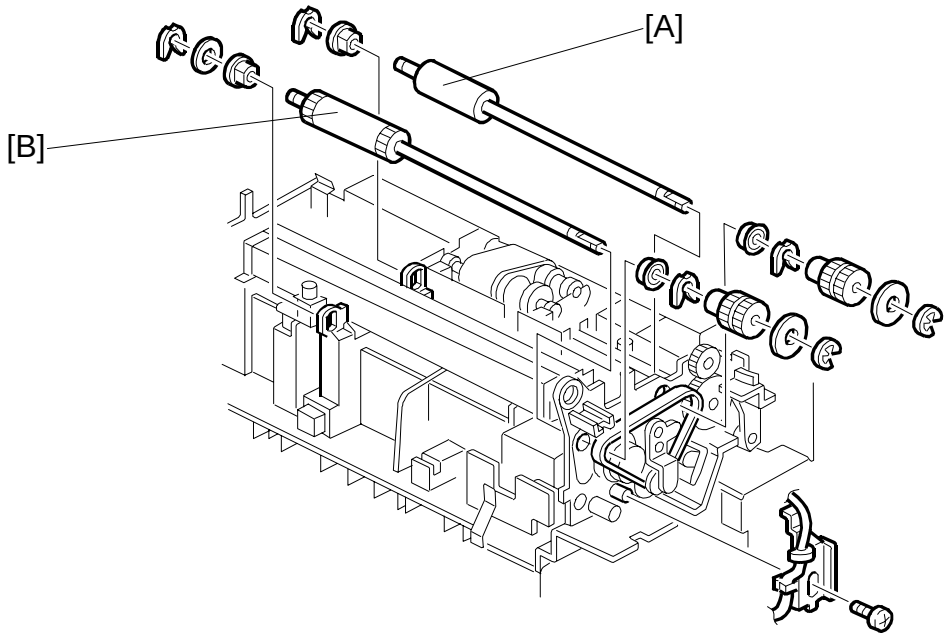
NOTE: When removing the scanner belt bracket [B], be careful not to lose the belt stopper [D]. When replacing the bracket, make sure that you replace the belt stopper as shown.



H547R522.WMF

A: Scanner Motor Assembly (2 screws)
B: Scanner Motor (2 screws, 1 connector)
C: FCU Cover (2 screws, G4 Interface Cover [D])

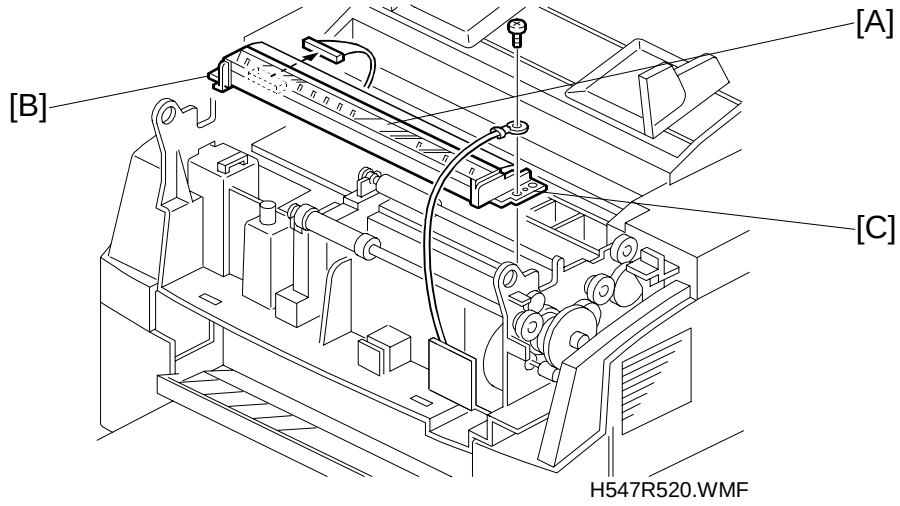
6.3.3 R1/R2 ROLLERS



H547R521.WMF

A: R1 Roller
(1 E-ring, 1 belt stopper, 1 gear clipped on the shaft, 2 plastic clips, 2 bushings)
B: R2 Roller
(1 E-ring, 1 belt stopper, 1 gear clipped on the shaft, 2 plastic clips, 2 bushings)

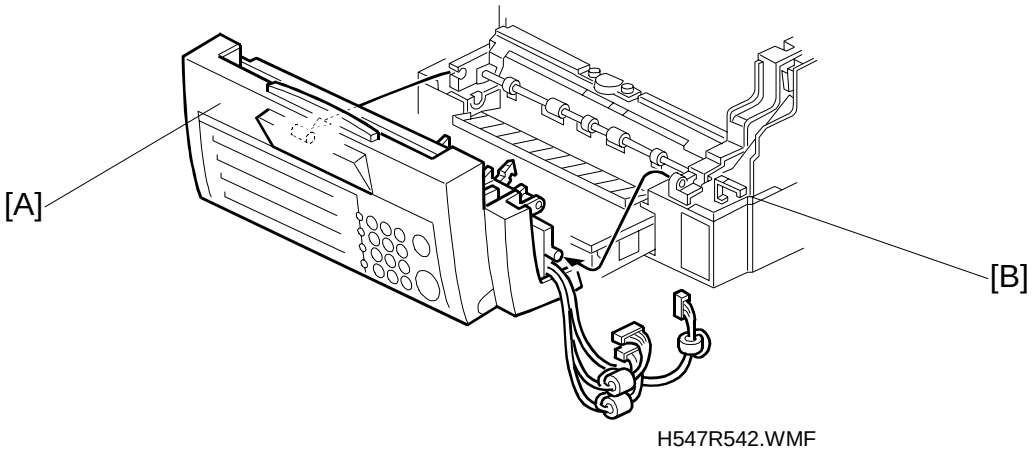
6.3.4 CONTACT IMAGE SENSOR ASSEMBLY



A: Contact Image Sensor Assembly (1 connector, 1 screw with grounding wire)

⚠CAUTION
Do not remove the brackets [B] and [C].

6.3.5 SCANNER UNIT



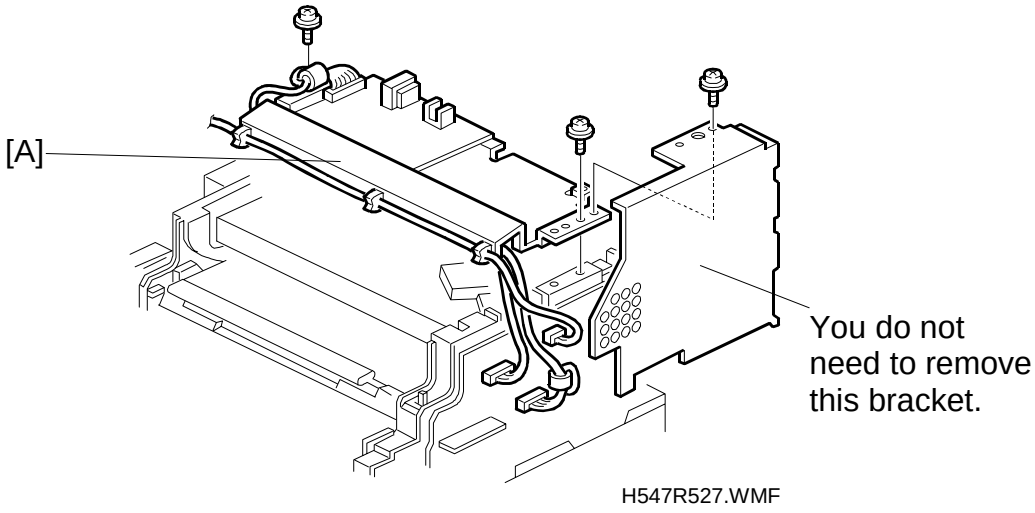
First, remove the top cover and the FCU cover (refer to section 6.3.2).

A: Scanner Unit (2 hooks, 4 connectors, 1 screw with grounding wire)

NOTE: When placing the cables in the clamp [B], put the 2 thin cables underneath the thick cable.
(The thick cable has multicolored wires and the thin ones have only black wires.)

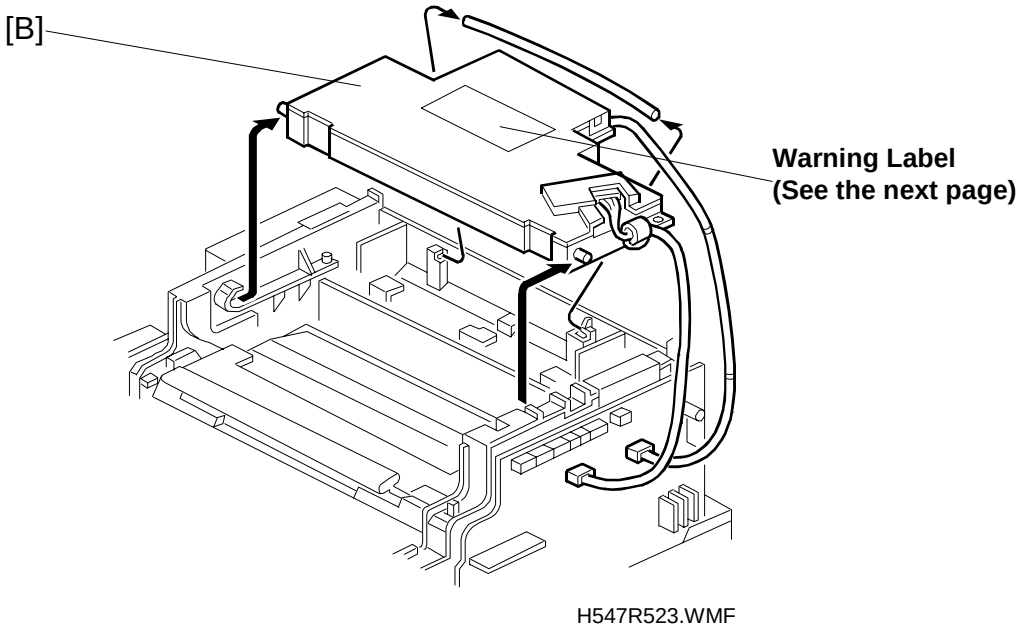
6.4 LASER PRINTING COMPONENTS

6.4.1 LASER UNIT



H547R527.WMF

First, remove the top cover, and then lift the NCU bracket [A] (3 screws).

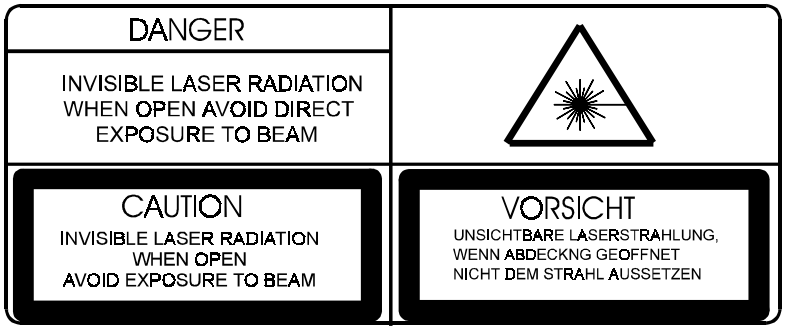


H547R523.WMF

B: Laser Unit (2 connectors, 1 spring rod)

⚠WARNING

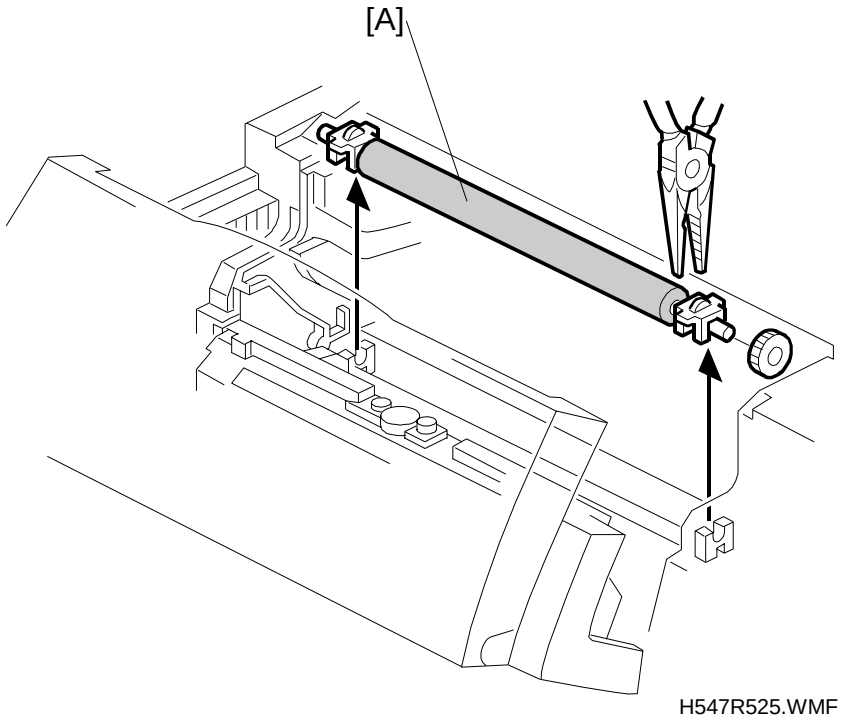
Laser beams can cause permanent eye damage. Do not open the laser unit or look along the laser beam path while the main power is on.



H547R500.WMF

6.5 DEVELOPMENT

6.5.1 TRANSFER ROLLER



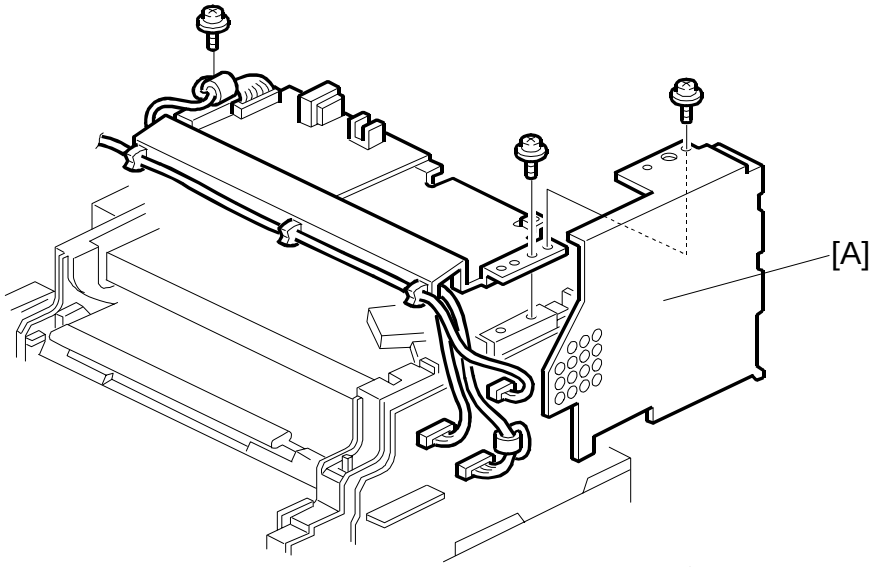
H547R525.WMF

First, open the scanner unit, then remove the cartridge.

A: Transfer Roller (1 gear, 2 clips)

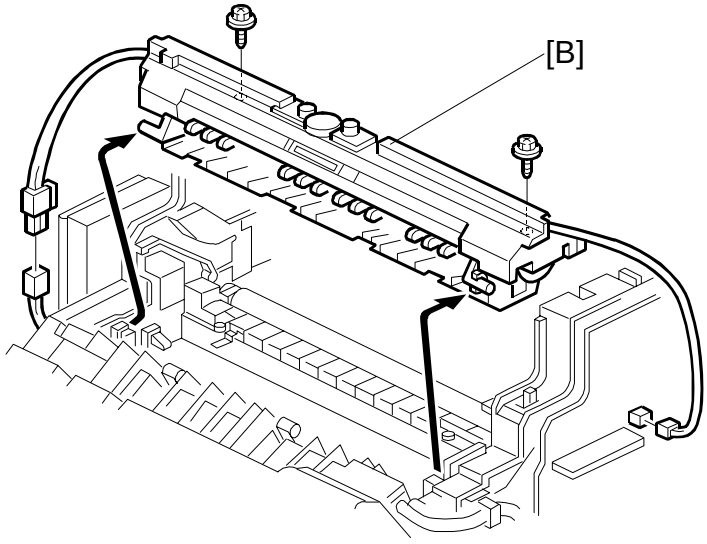
6.6 FUSING

6.6.1 FUSING UNIT



H547R527.WMF

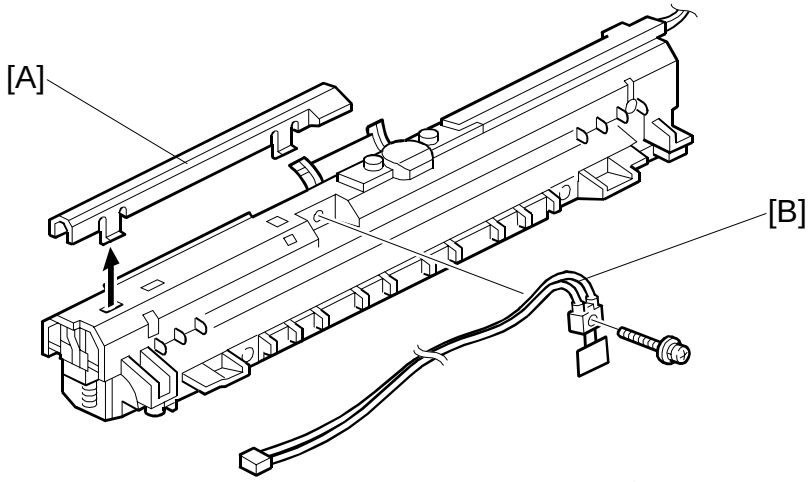
First, remove the top cover. Then remove the FCU cover [A].



H547R526.WMF

B: Fusing Unit (2 screws, 2 connectors)

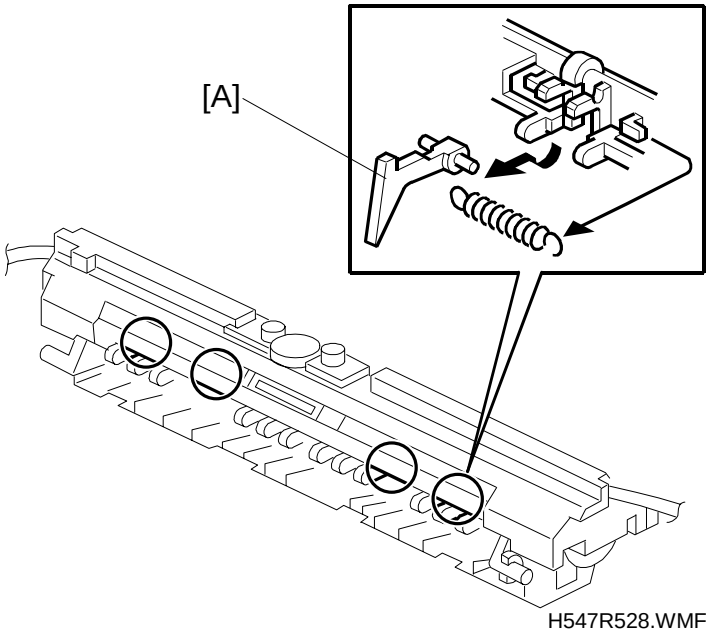
6.6.2 THERMISTOR



H547R513.WMF

A: Thermistor Cover (4 hooks)
B: Thermistor (1 screw)

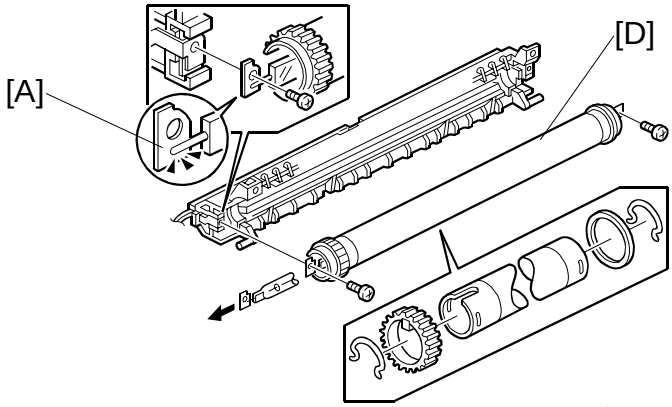
6.6.3 HOT ROLLER STRIPPERS



H547R528.WMF

A: Hot Roller Strippers (1 spring each)
NOTE: Be careful not to lose the springs.

6.6.4 FUSING LAMP AND HOT ROLLER

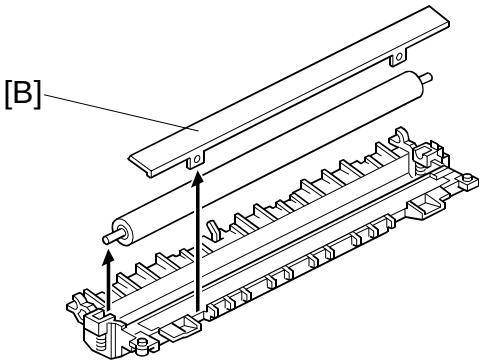


H547R510.WMF

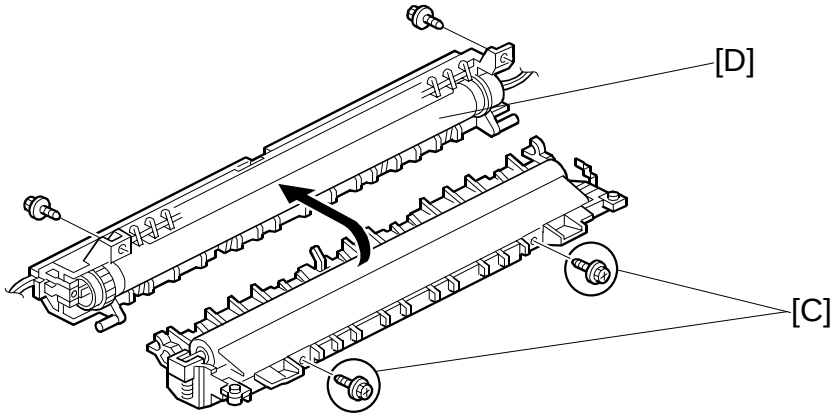
A: Fusing Lamp (2 screws)

NOTE: When installing a new fusing lamp, be sure that it is installed the correct way around, as shown.

⚠CAUTION
Be careful not to touch the glass surface.



H547R509.WMF

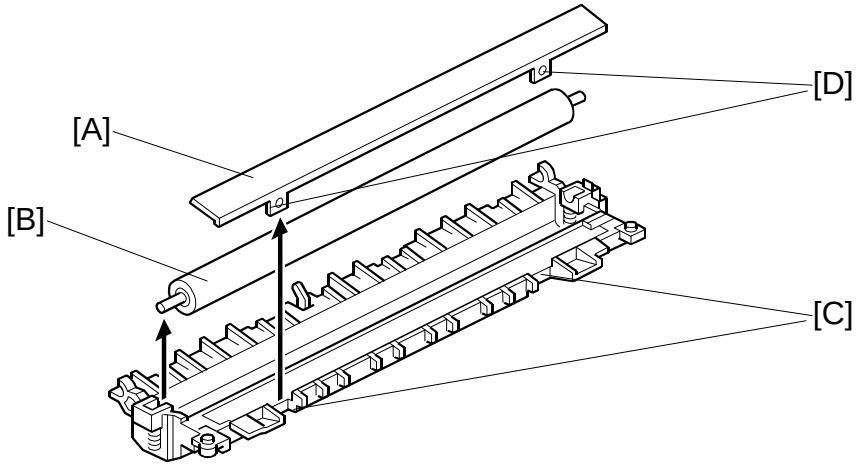


H547R512.WMF

First, remove the bracket [B] and 2 screws [C], then the fusing upper and lower units come apart.

D: Hot Roller

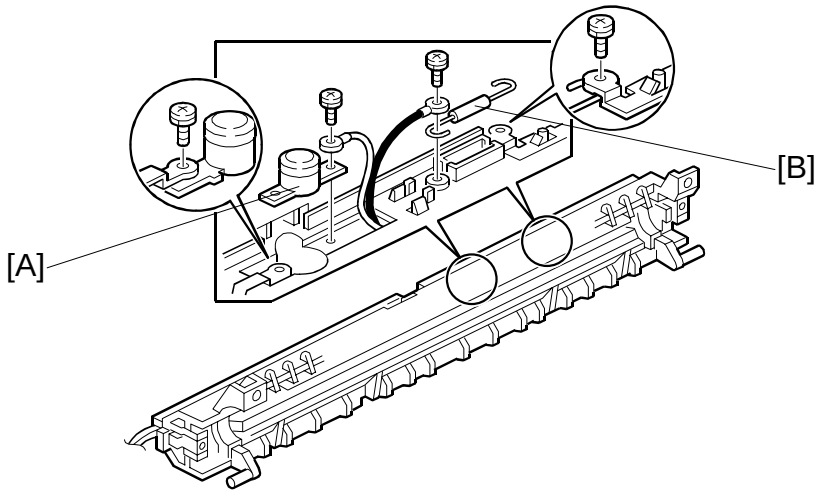
6.6.5 PRESSURE ROLLER



H547R509.WMF

A: Bracket (2 screws)
NOTE: Fit the projections [C] into the holes [D] when replacing this bracket.
B: Pressure Roller

6.6.6 THERMOSTAT AND THERMOFUSE

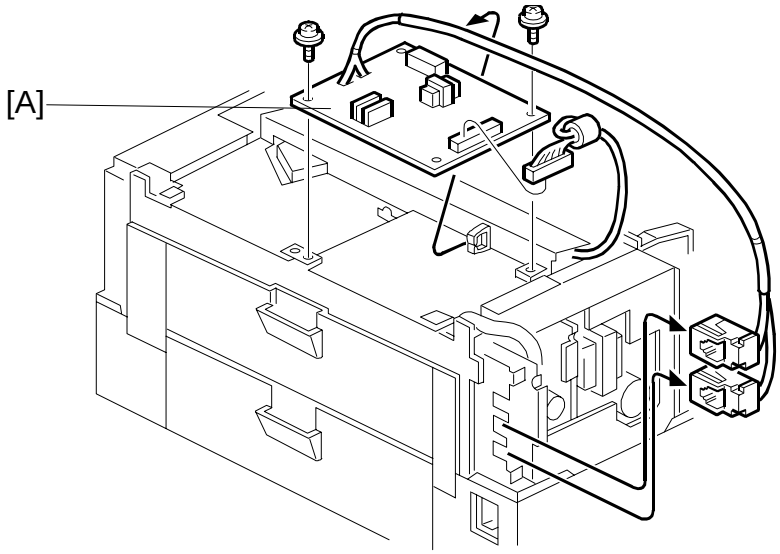


H547R511.WMF

A: Thermostat (2 screws)
B: Thermofuse (2 screws) – Europe model only

6.7 PCBs

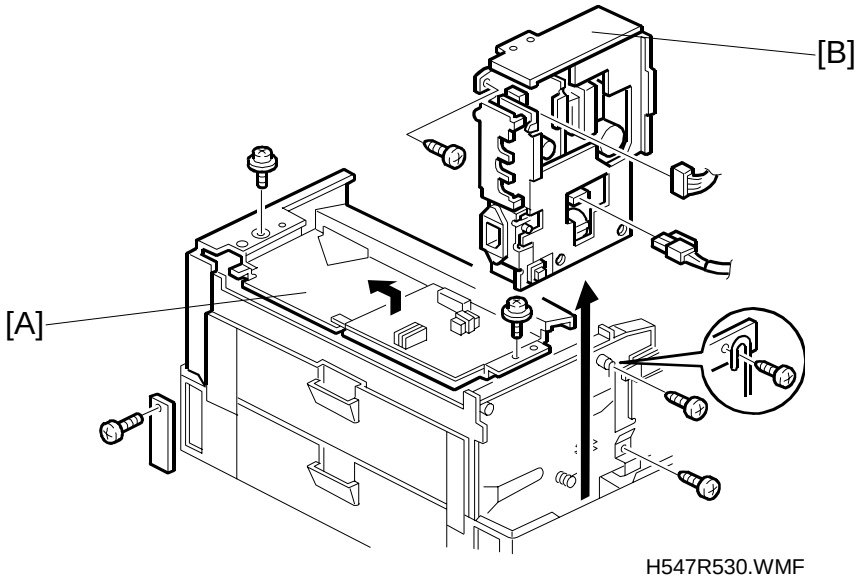
6.7.1 NCU



First, remove the Top Cover.

A: NCU (2 screws, 1 connector)

6.7.2 PSU

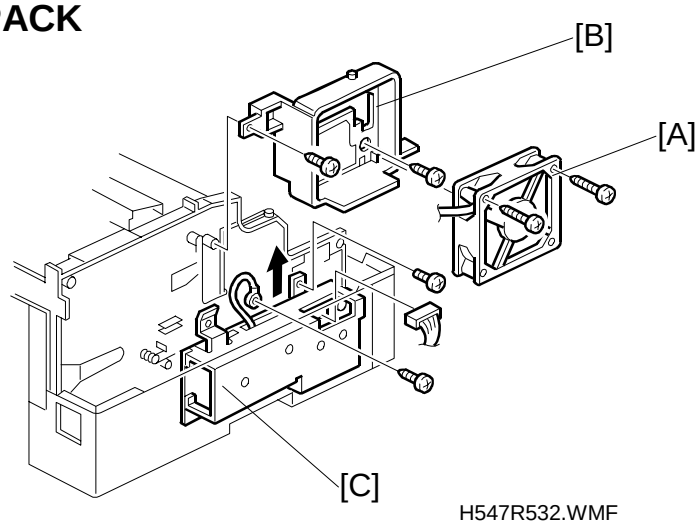


First, remove the Top Cover.

A: NCU Bracket (2 screws)

B: PSU (3 screws, 2 connectors)

6.7.3 POWER PACK

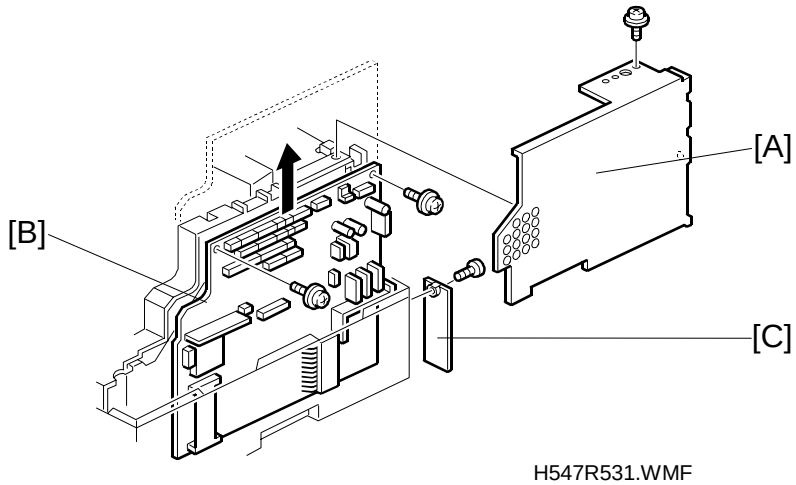


H547R532.WMF

First, remove the PSU.

A: Fan Motor (2 screws)
B: Fan Duct (2 screws)
C: Power Pack (1 screw, 1 screw with grounding wire, 1 connector)

6.7.4 FCU



H547R531.WMF

When replacing the FCU, upload the RAM data from the old FCU using service function 12 (refer to section 4.1.24), and copy the data to the new FCU (refer to section 4.1.25.)

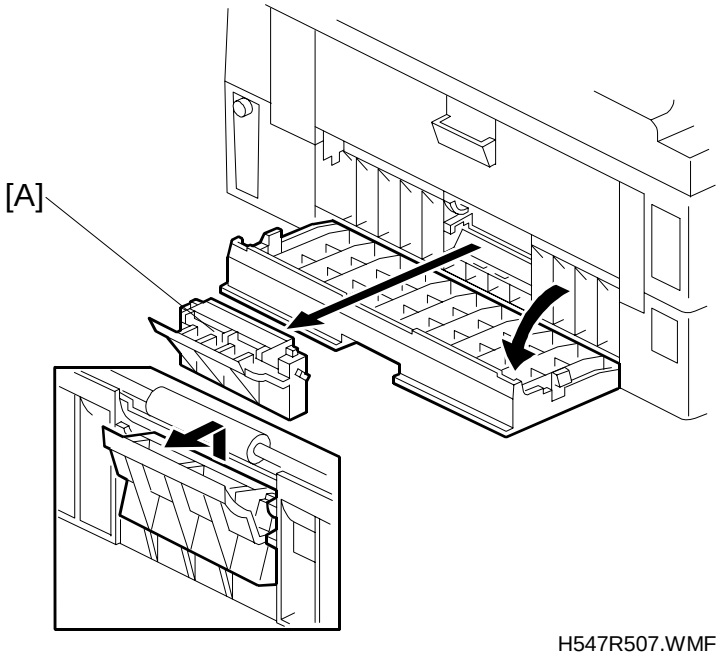
First, remove the Top Cover.

A: FCU Cover (2 screws, PC Interface Cover [C])
B: FCU (2 screws, 23 connectors)

NOTE: Turn on SW1 on the new FCU.

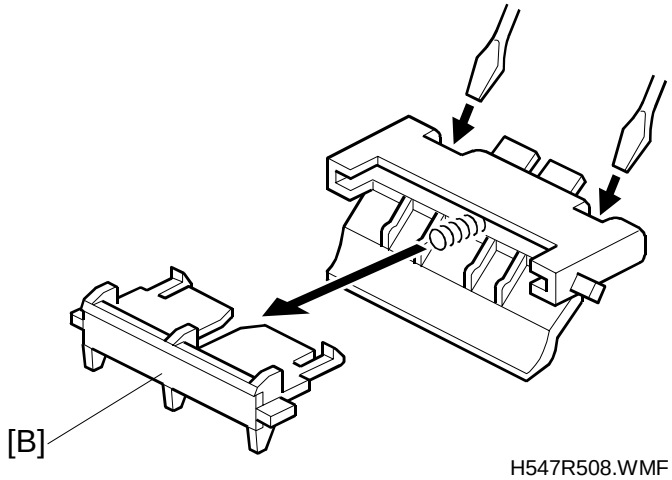
6.8 PAPER FEED

6.8.1 SEPARATION PAD



H547R507.WMF

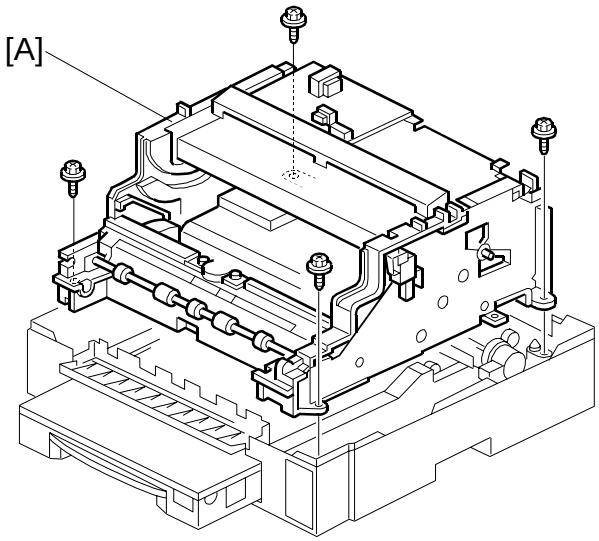
A: Separation Pad Assembly



H547R508.WMF

B: Separation Pad

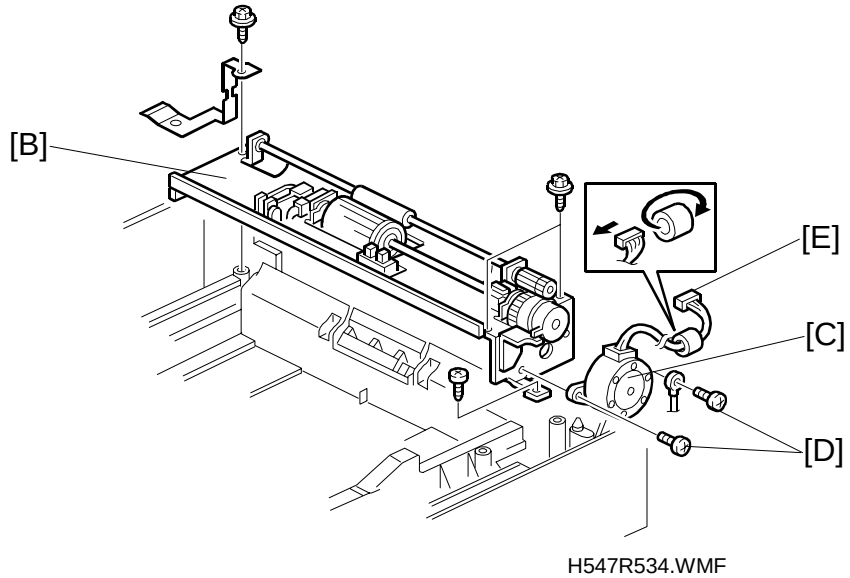
6.8.2 PAPER FEED UNIT ASSEMBLY AND PAPER FEED MOTOR



H547R535.WMF

If the FCU, PSU and Power Pack were not removed previously, remove them now. (See section 6.7)
Then remove the **Main Frame [A]**.

A: Main Frame (4 screws)

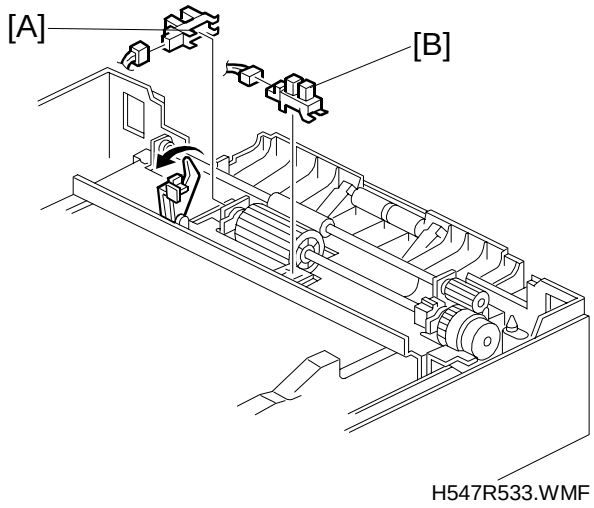


H547R534.WMF

B: Paper Feed Unit Assembly (4 screws)
C: Paper Feed Motor (1 short screw with spacer and grounding wire, 1 screw with spacer)

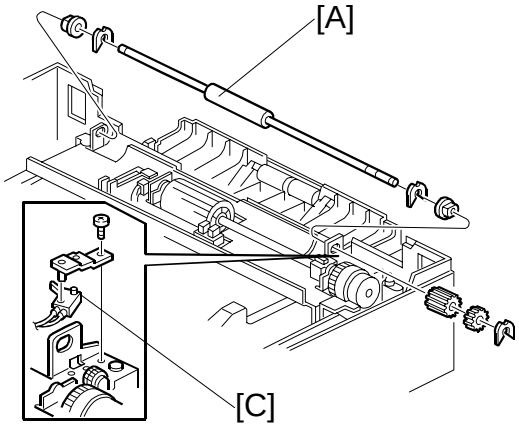
NOTE: Use 4mm screws [D] to secure the motor.
NOTE: The side of the motor with the harness [E] must be facing upward.

6.8.3 PAPER END SENSOR AND REGISTRATION SENSOR

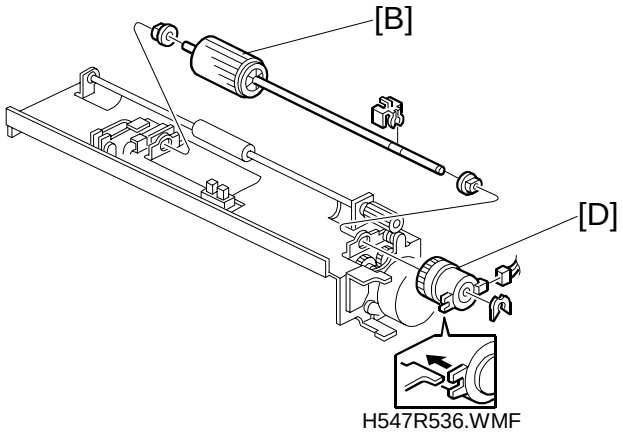


A: Paper-End-Sensor (1 connector)
B: Registration Sensor (1 connector)

6.8.4 PAPER FEED ROLLER/CLUTCH AND TRANSPORT ROLLER



H547R544.WMF



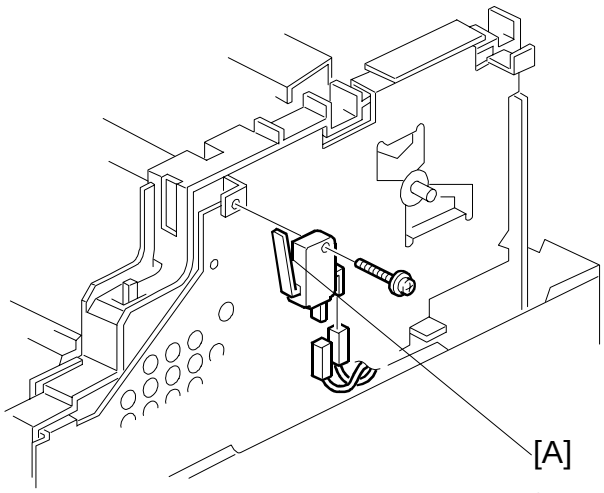
First, remove the Paper Feed Unit Assembly.

A: Transport Roller (3 plastic clips, 2 bushes, 2 gears)
B: Paper Feed Roller (1 clip, 1 bush, 2 plastic clips)
C: Rear Cover Sensor (1 screw)
D: Paper Feed Clutch (1 E-ring, 1 connector)

NOTE: Make sure that the paper feed roller shaft rotates clockwise when viewed from the right of the machine.

6.9 OTHERS

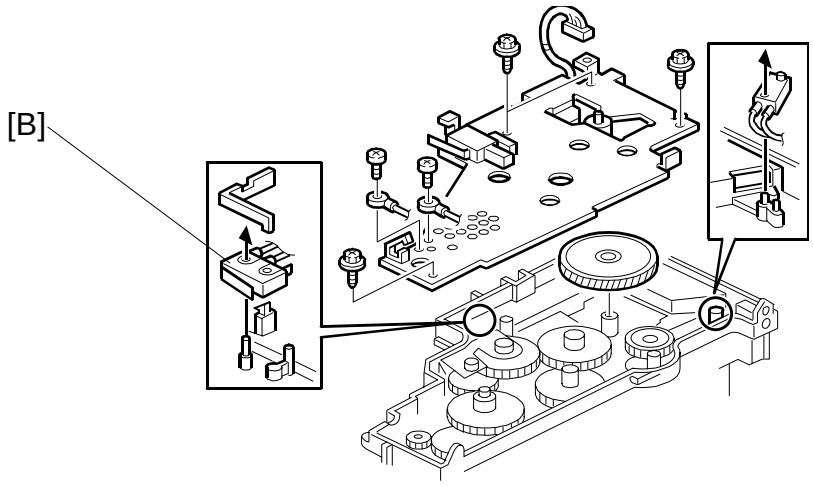
6.9.1 INTERLOCK SWITCHES



H547R540.WMF

First, remove the Top Cover, then remove the FCU (see section 6.7.4).

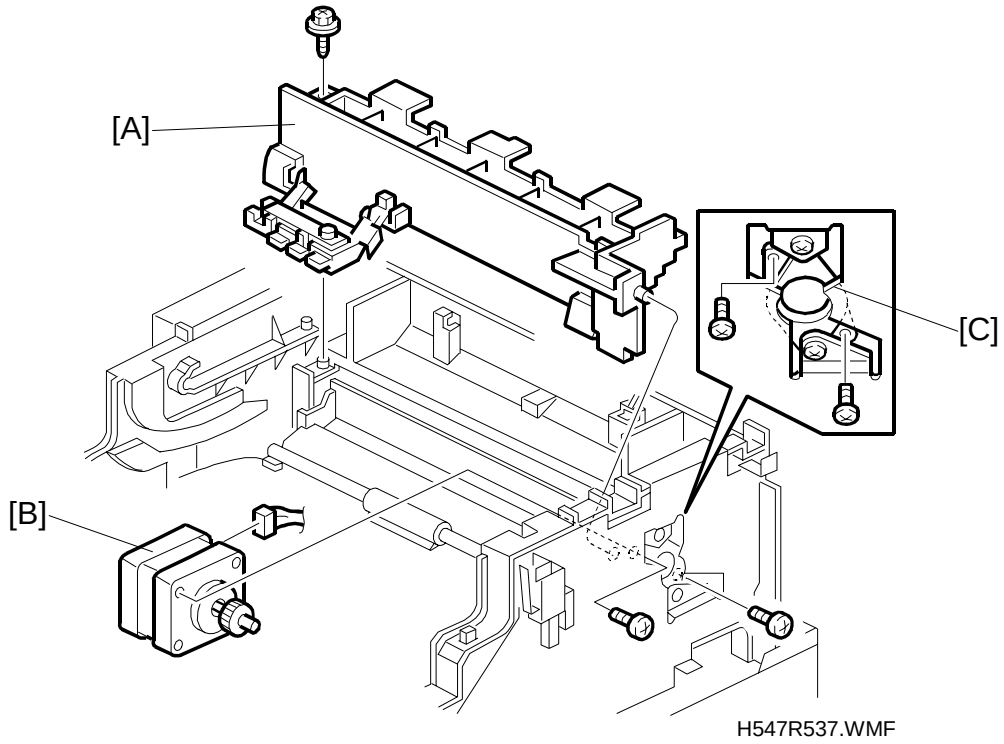
A: Interlock Switch - 24V (1 screw)



H547R538.WMF

B: Interlock Switch - 5V (1 screw)

6.9.2 MAIN MOTOR

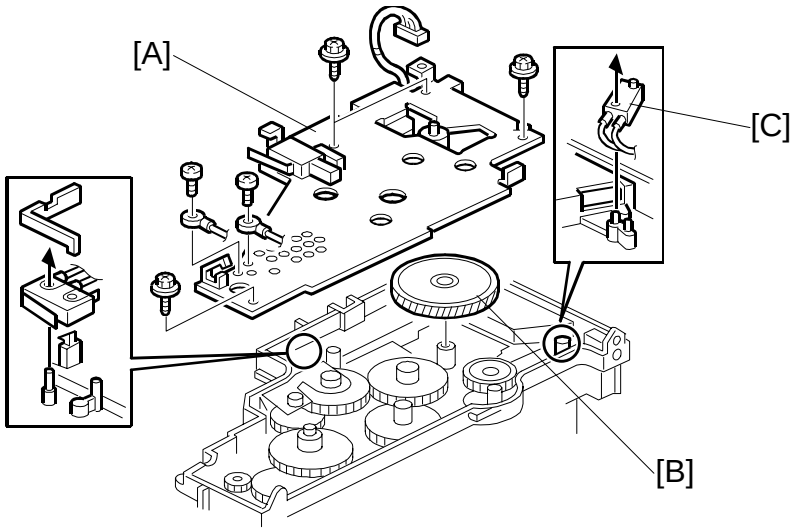


First, remove the Top Cover, then remove the Laser Unit (see section 6.4.1) and the FCU (see section 6.7.4).

A: Stay (1 screw)
B: Main Motor (2 screws)

NOTE: Do not remove the damper [C], because it is factory adjusted.

6.9.3 REGISTRATION ROLLER

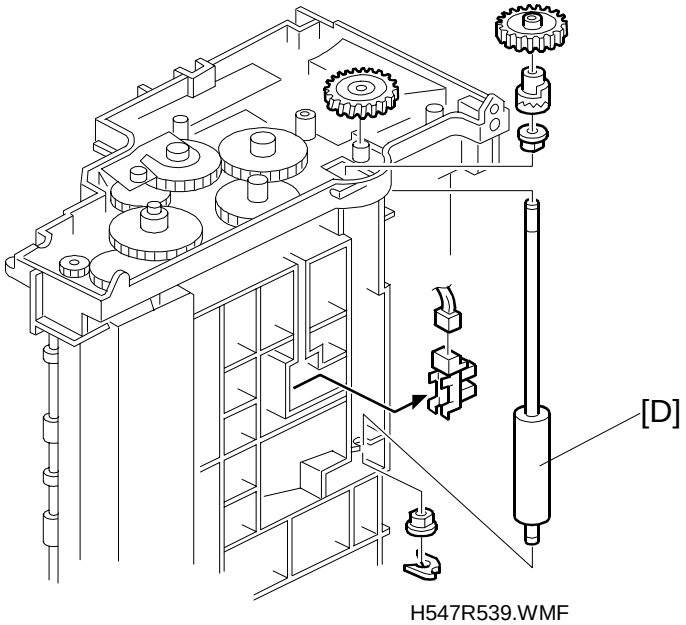


H547R538.WMF

First, remove the Main Frame (see section 6.8.1).

A: Right Bracket (5 screws, 2 grounding wire)

NOTE: When replacing the Right Bracket [A], do not forget to put back the coupled gear [B] and microswitch [C].



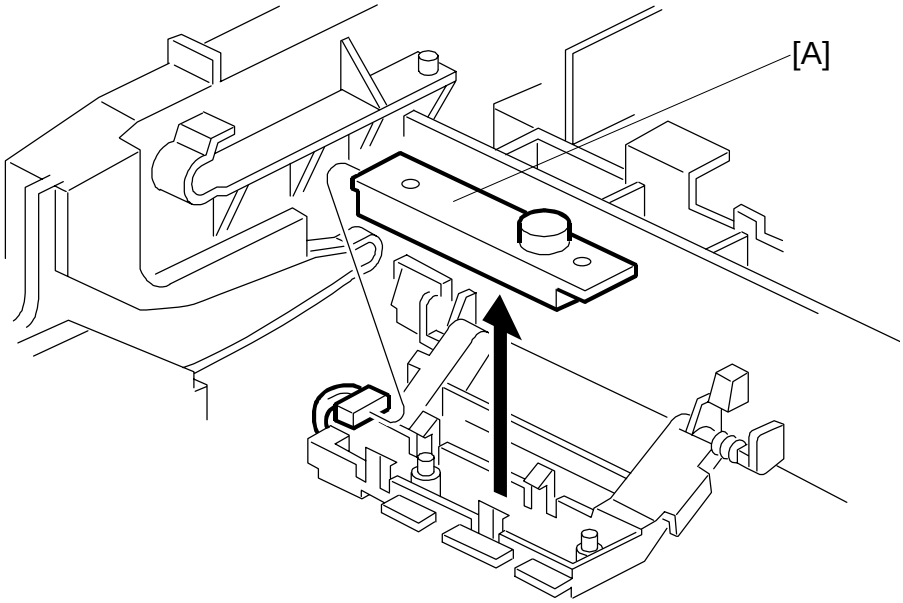
H547R539.WMF

Remove the Rear Lower Cover, then stand the Main Frame on its side, as shown.

NOTE: Do not let the gears drop while standing the Main Frame on its side.

D: Registration Roller (1 coupled gear, 1 gear, 2 bushings, 1 plastic clip, and a one-way clutch gear)

6.9.4 TONER END SENSOR

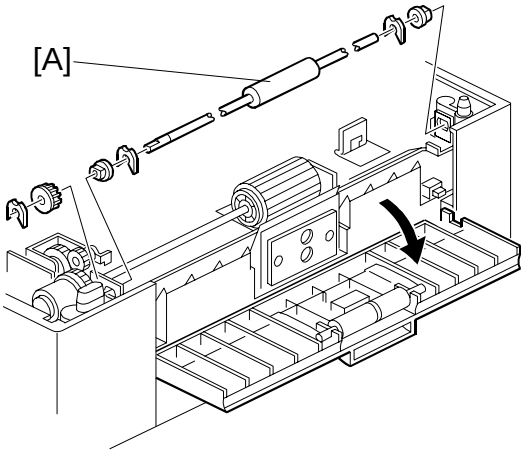


H547R541.WMF

A: Toner End Sensor (1 connector)

6.10 PAPER FEED UNIT (OPTIONAL)

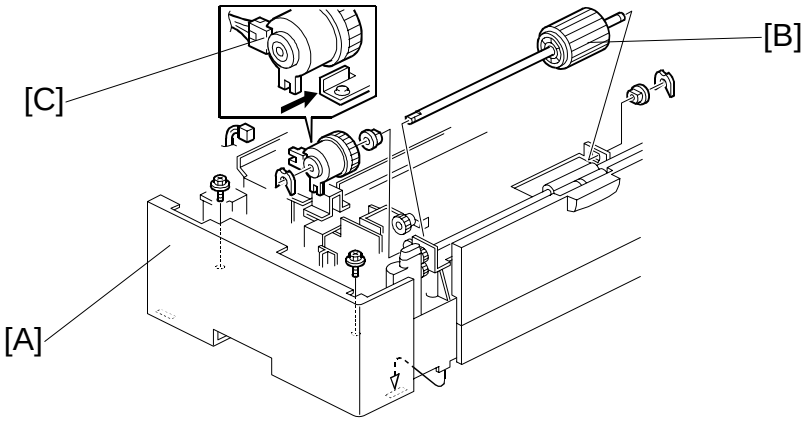
6.10.1 TRANSPORT ROLLER



H547R502.WMF

A: Transport Roller (3 plastic clips, 2 bushings, 1 gear)

6.10.2 PAPER FEED ROLLER AND PAPER FEED CLUTCH



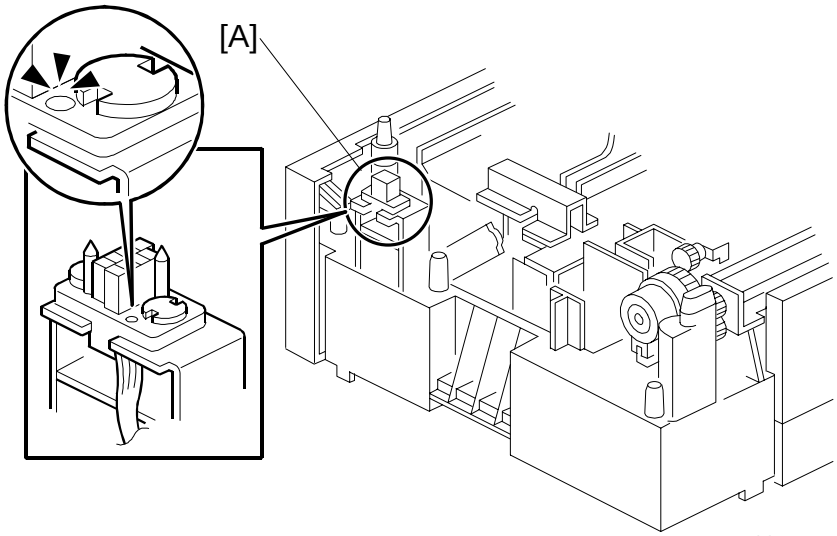
H547R501.WMF

First, remove the mainframe, then remove the Right Cover [A].

B: Paper Feed Roller (2 plastic clips, 2 bushings)
C: Paper Feed Clutch (1 connector)

NOTE: Make sure that the paper feed roller shaft rotates clockwise when viewed from the right of the machine.

6.10.3 CONNECTOR

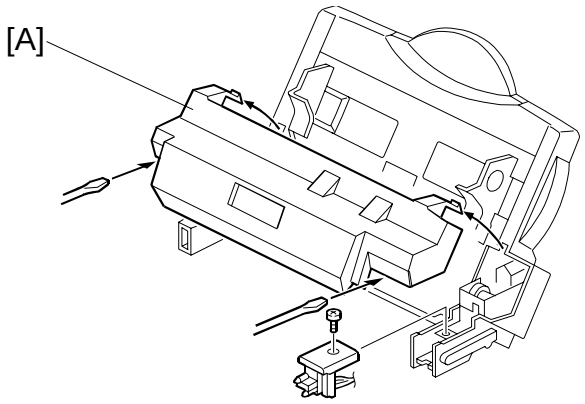


A: Connector (2 clips)

NOTE: When installing the connector [A], the side with the small hole must face the outside of the machine.

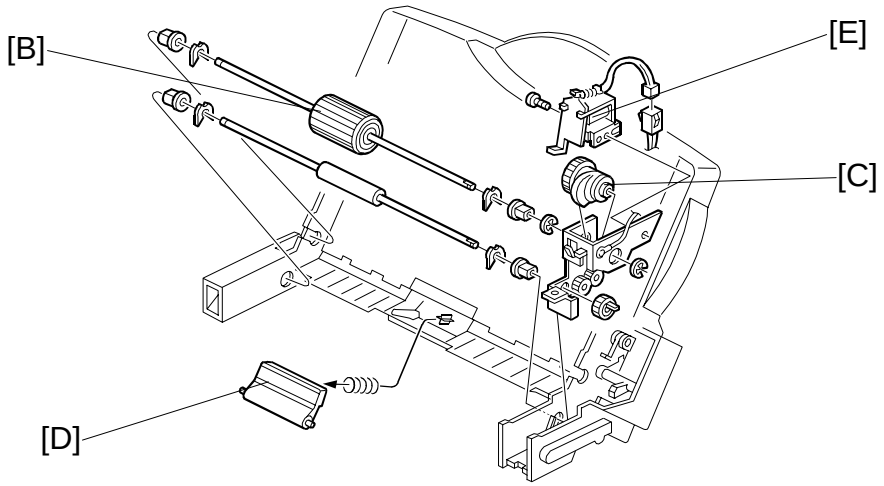
6.11 MULTI-PURPOSE FEEDER (OPTIONAL)

6.11.1 PAPER FEED ROLLER, SEPARATION PAD, PAPER FEED CLUTCH AND SOLENOID



H547R504.WMF

First, remove the Top Cover Assembly [A] (1 screw, 6 hooks).

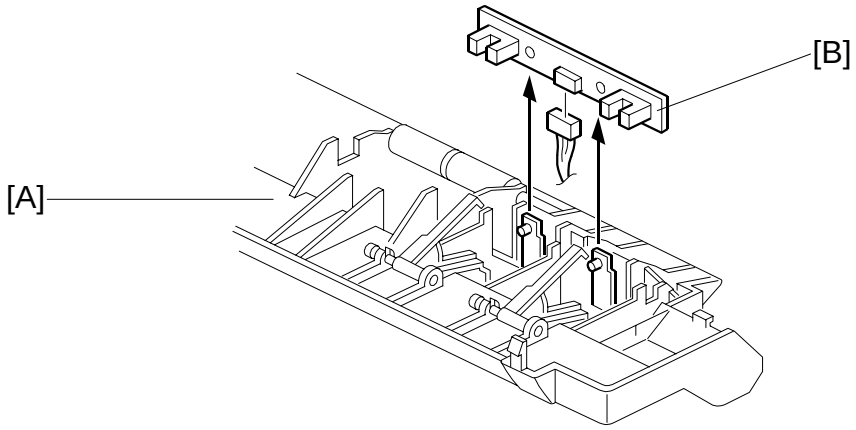


H547R506.WMF

B: Paper Feed Roller (3 plastic clips, 1 bushing, 1 E-ring)
C: Paper Feed Clutch
D: Separation Pad (1 spring)
E: Solenoid (1 screw)

NOTE: Make sure that the paper feed roller shaft rotates clockwise when viewed from the left of the machine.

6.11.2 PCB



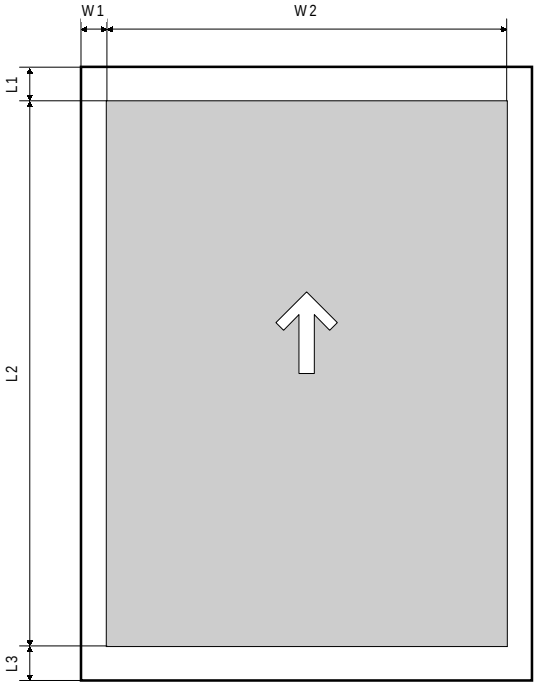
H547R505.WMF

First, remove the Top Cover Assembly [A] (1 screw, 6 hooks), and turn it over.

B: PCB (1 connector)

6.12 IMAGE ADJUSTMENT

6.12.1 OVERVIEW



H547R650.WMF

This section explains how to adjust the scanning and printing parameters. Among these are the margin parameters shown in the diagram below, which are named in accordance with the following table.

Parameters	Description	Adjustable by	
		Scanning	Printing
W1	Left margin	Adjustable	Adjustable
W2	Print/Scan width	Not adjustable	Not adjustable
L1	Top margin	Adjustable	Adjustable
L2	Print/Scan length	Not adjustable	Not adjustable
L3	Bottom margin	Adjustable	Not adjustable

⚠CAUTION

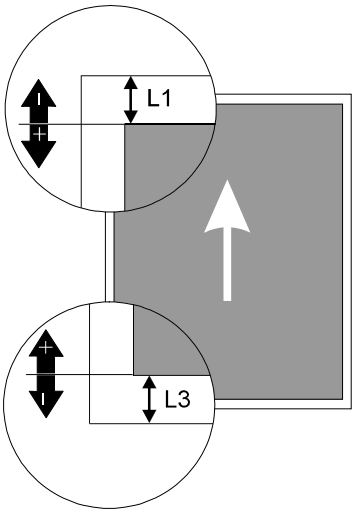
The factory settings may not be the same as the "Initial settings" described in the following procedures. The RAM reset level 0 will reset all the scan and print margin parameters to the "Initial settings."

6.12.2 SCANNER PARAMETERS

1. Contrast

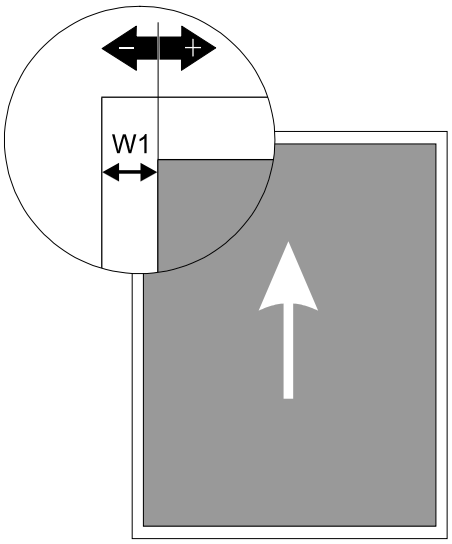
	Text Mode		Halftone Mode	
	Address	**Initial Setting**	**Address**	**Initial Setting**
Auto	800CE5(H)	0F(H)	800CE9(H)	0C(H)

2. Margins

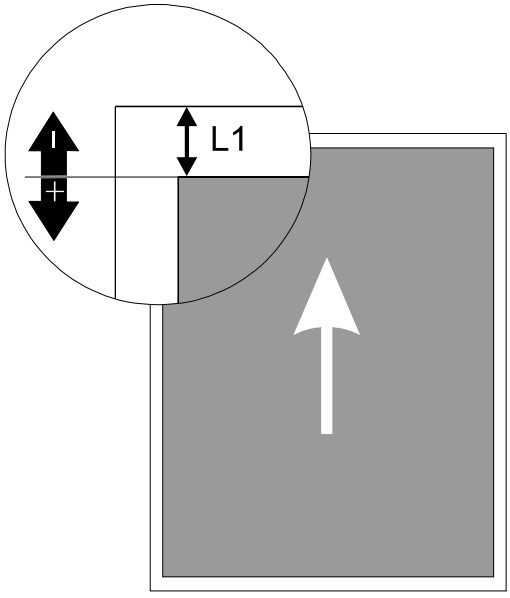
Parameter	Formula	RAM Address	Unit	Initial Setting
W1	Not adjustable			
W2	Not adjustable			
L1	 H547R651.WMF This parameter changes the number of scanner motor steps after the scan line sensor is activated. To increase the margin by x mm: **New setting = Current setting + 7.7x** To decrease the margin by x mm: **New setting = Current setting - 7.7x**	**800826(H) (low) 800827(H) (high)**	$\frac{1}{7.7}mm$	**00BE (H)**
L2	Not adjustable			
L3	This parameter changes the number of scanner motor steps after the scan line sensor is activated. To increase the margin by x mm: **New setting = Current setting + 7.7x** To decrease the margin by x mm: **New setting = Current setting - 7.7x**	**800828(H) (low) 800829(H) (high)**	$\frac{1}{7.7}mm$	**0136 (H)**

6.12.3 PRINTER PARAMETERS

1. Margins (Main Scan Direction)

Parameter	Formula	RAM Address	Unit	Initial Setting
W1	 H547R648.WMF To increase the margin by x mm: **New setting = Current setting + x/0.5** To decrease the margin by x mm: **New setting = Current setting - x/0.5** When the user sets the margin in the main scan direction with a User Function, the margin is added to this setting.	Standard cassette: 800455(H) Optional paper feed unit: 800456(H) Optional multi-purpose feeder: 80045A(H)	0.5 mm	08(H) 08(H) 07(H)
W2	Not adjustable			

2. Margins (Sub Scan Direction)

Parameter	Formula	RAM Address	Unit	Initial Setting
L1	 H547R562.WMF To increase the margin by x mm: **New setting = Current setting + x/0.32** To decrease the margin by x mm: **New setting = Current setting - x/0.32** When the user sets the margin in the sub-scan direction with a User Function, the margin is added to this setting (unit of 0.64 mm).	Standard cassette: 800449(H) Optional paper feed unit: 80044A(H) Optional multi purpose feeder: 80044E(H)	0.32 mm	0A(H) 0A(H) 0A(H)
L2	Not adjustable			
L3	Not adjustable			

6.12.4 SCANNER VIDEO PROCESSING PARAMETERS

The tables in the following pages show the video processing parameter settings for each scanning mode.
One byte of parameters is assigned for each mode (text or halftone), and they all have the same definitions as follows:

MTF / Edge detection / Edge enhancement

Bit No.	FUNCTION	COMMENTS
0-3	Not used	Do not change the settings.
4	MTF 0: On 1: Off	This bit is for text mode only. 0: Enhances the thickness of thin lines and dots, but also makes dust more obvious. 1: Thin lines may not reproduce clearly.
5	Edge enhancement 0: Off 1:On	This bit is for halftone mode only. 0: Suitable for photo originals. 1: Suitable for originals with photo and text. The edges of text become much sharper, but moire might appear in photo areas.
6	Edge detection 0: On 1: Off	This bit is for halftone mode only. 0: Suitable for most photo originals. 1: The image becomes lighter, and thin lines become paler.
7	Not used	Do not change the settings.

Mode		Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Text	AID on	800CED(H)	0	1	0	0	0	0	0	0
Halftone	AID off	800CF5(H)	1	0	0	0	1	1	1	1

AID: Auto Image Density

NOTE: Do not change bits in the shaded part of the table.

MTF algorithm

Bit No.	FUNCTION	COMMENTS
0-4	Not used	Do not change the settings.
5 6	MTF algorithm Bit 6 5 Setting 0 0 High on main and sub scan 0 1 Low on main and sub scan 1 0 High on sub scan 1 1 Low on sub scan	The ”high” setting enhances the thickness of thin lines and dots more than the “low” setting, however it also makes dust more obvious.
7	Not used	Do not change the settings.

Mode		Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Text	AID on	800CEE(H)	1	1	0	1	0	0	0	0
Halftone	AID off	800CF6(H)	1	0	1	1	0	0	0	0

AID: Auto Image Density

NOTE: Do not change bits in the shaded part of the table.

Background detection threshold

Bit No.	FUNCTION	COMMENTS
0-1	Not used	Do not change the settings.
2	Background detection threshold 0: Low 1: High	This bit is for text mode only. 0: Suitable for originals that have dark background. 1: The text thickness is enhanced, however dust becomes more obvious.
3-7	Not used	Do not change the settings.

Mode		Address	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Text	AID on	800CF0(H)	1	0	0	0	0	0	0	0
Halftone	AID off	800CF8(H)	1	0	0	0	0	0	0	0

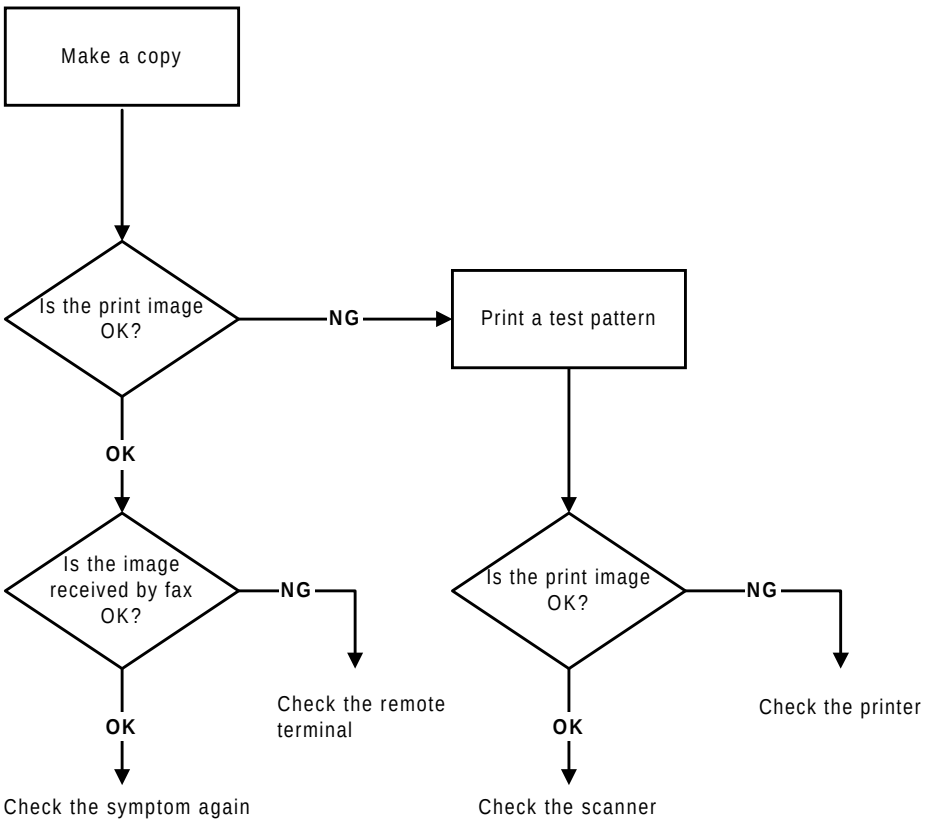
AID: Auto Image Density

NOTE: Do not change bits in the shaded part of the table.

7. TROUBLESHOOTING

7.1 COPY QUALITY TROUBLESHOOTING

If there is a copy quality problem that cannot be solved easily, try using the following troubleshooting procedures, while referring to the point-to-point diagram. The procedures may not be exhaustive, but they may help you to find the problem.



H547T501.WMF

First, distinguish whether the problem is caused by the remote terminal or by your machine. If your machine causes the problem, determine whether it is due to a scanner or printer problem.

7.1.1 BLANK COPIES

Possible Cause (Printer)

- Poor drum sensitivity.
- Laser optic components are out of position.
- The proper bias voltages are not applied to the toner application roller and/or the development roller.
- The proper current is not applied to the transfer roller.

Action:

1. Print a test pattern, and open the cover in the middle of printing.
2. Check to see if there is toner adhered to the drum surface.
   If there is, do the following. If not, go to step 3.
   - Check to see if the cartridge is correctly installed.
   - Check to see if the transfer roller is correctly positioned.
3. Check if there is toner on the surface of the development roller.
   If there is, do the following. If not, go to step 4.
   - Check to see if the laser optic components are properly positioned.
4. Check to see if the cartridge is empty. If it is, replace the cartridge.
   If not, do the following.
   - Check the connection between the FCU (CN13) and the toner end sensor
   - Replace the toner end sensor.

7.1.2 BLACK COPIES

Possible Cause (Scanner)

- The contact image sensor is defective.

Action:

1. Check the connection between the FCU (CN8) and the contact image sensor.
2. Replace the contact image sensor.

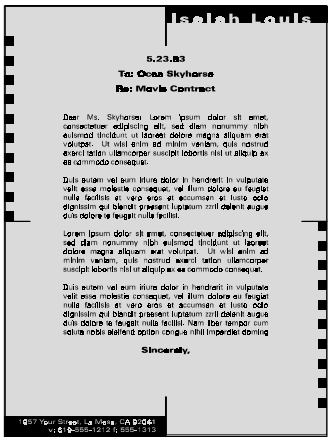
Possible Cause (Printer)

- The charge is improperly applied.

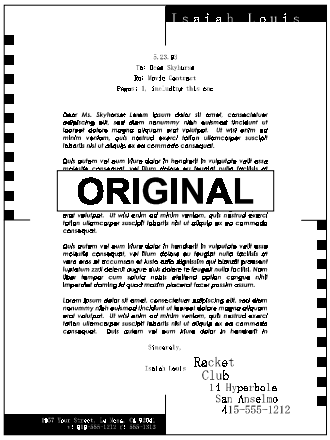
Action:

1. Check the connections between the power pack, the charge voltage terminals, and the cartridge.
   - If they are OK, go to step 2.
   - If not, fix the connections.
2. Check the connections behind the power pack.

7.1.3 DIRTY BACKGROUND



H547T502.WMF



H547T503.WMF

Possible Cause (Scanner)

- Scanner shading correction error or incorrect threshold.

Action:

1. Clean the shading white roller.
2. Adjust the scanner contrast threshold settings.

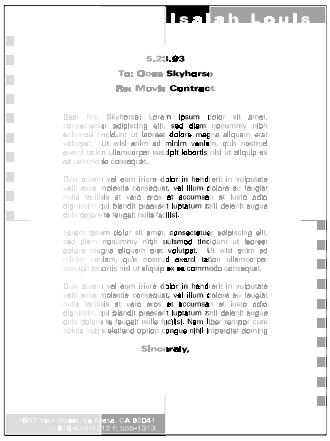
Possible Cause (Printer)

- Poor drum sensitivity.
- The charge is improperly applied.
- The hot roller is dirty.

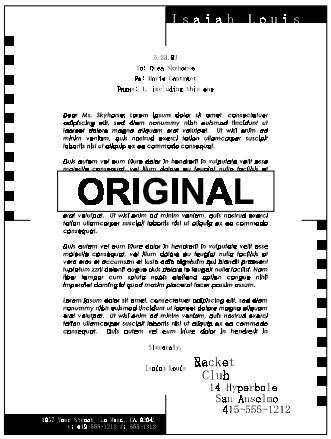
Action:

1. Try replacing the cartridge.
2. Check to see if the hot roller surface is dirty.
   - If it is, clean the roller or replace the cleaning pad.
   - If not, go to step 3.
3. Check to see if all the charge bias terminals and the cartridge.
   - If they are, check or replace the power pack.
   - If not, fix the connections.

7.1.4 UNEVEN IMAGE DENSITY



H547T504.WMF



H547T503.WMF

Possible Cause (Scanner)

- Dirty exposure glass
- Partial scanner lamp defect

Action

- Clean the exposure glass of the image sensor.
- Replace the image sensor.

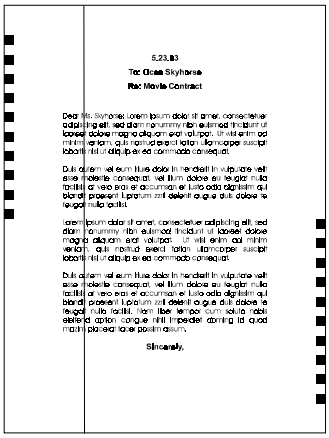
Possible Cause (Printer)

- Poor drum sensitivity.
- Dirty laser optic components.
- A deformed toner metering blade.
- Uneven toner supply in the toner hopper.

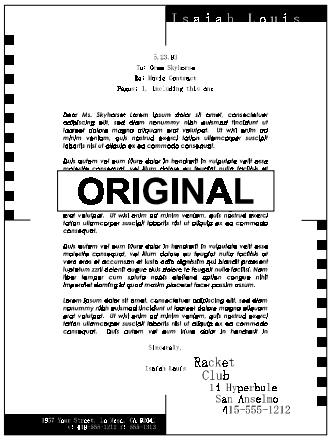
Action:

1. Print a solid black test pattern, and open the cover in the middle of printing.
2. If the image is lighter in the center of the image, the toner may be low. Replace the cartridge. If it is not, go to step 3.
3. Check to see if the toner is evenly distributed on the drum.
   - If it is not, check the cartridge and the laser optic components.
   - If it is, check if there is any dirt on the transfer roller surface.

7.1.5 VERTICAL BLACK LINES



H547T505.WMF



H547T503.WMF

Possible Cause (Scanner)

- Defective contact image sensor element(s).
- Dirt or dust on the exposure glass.
- Dirty white roller in the ADF.

Action:

1. Clean the exposure glass and the shading white roller.
2. Replace the contact image sensor.

Possible Cause (Printer)

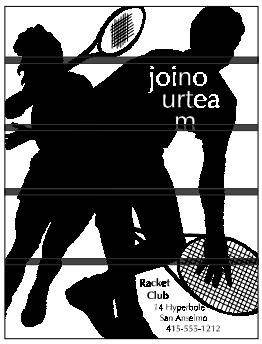
- Damaged cleaning blade.
- Dirty hot roller stripper(s).

Action:

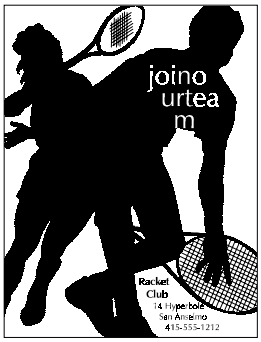
1. Replace the cartridge.
2. Clean the hot roller strippers.

Trouble-shooting

7.1.6 HORIZONTAL BLACK LINES



H547T506.WMF



H547T507.WMF

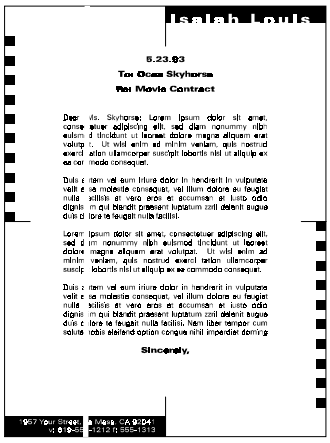
Possible Cause (Printer)

- The drum surface is scratched or damaged.

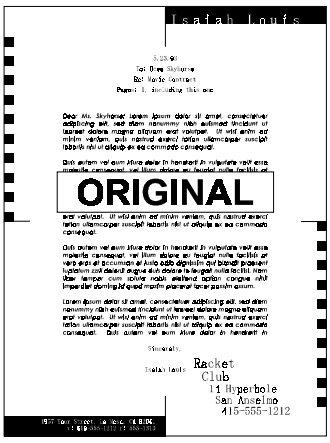
Action:

1. Check to see if the surface of the drum is damaged.
   - Change the cartridge if damaged.

7.1.7 VERTICAL WHITE LINES



H547T508.WMF



H547T503.WMF

Possible Cause (Scanner)

- Defective image sensor element(s).

Action:

- Replace the image sensor.

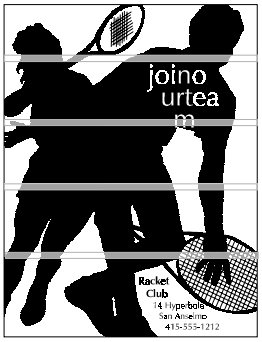
Possible Cause (Printer)

- The laser optic components are dirty.
- The hot roller stripper scrapes off toner from the print paper.
- Damaged cleaning blade.

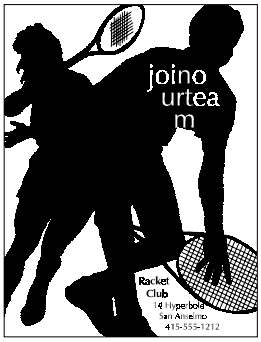
Action:

- Clean the laser optic components.
- Check the hot roller stripper mechanism. Clean the strippers and replace them if damaged.
- Replace the cartridge.

7.1.8 HORIZONTAL WHITE LINES



H547T509.WMF



H547T511.WMF

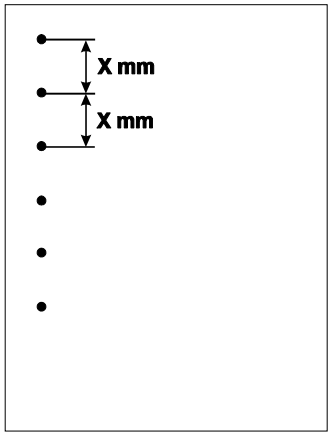
Possible Cause (Printer)

- A damaged or deformed development roller surface.
- The development bias is unstable.
- The transfer current is unstable.

Action:

1. Print a test pattern, and open the cover in the middle of printing.
2. Check to see if horizontal white lines (where toner is not adhered) appear on the drum surface or not.
   - If not, check the transfer roller surface and the transfer bias terminal connections. If they are OK, check or replace the power pack.
   - Change the cartridge.

7.1.9 BLACK DOTS/SPOTS



H547T510.WMF

Possible Cause (Scanner)

- Dust on the exposure glass.

Action:

- Clean the exposure glass.
- Try disabling MTF.

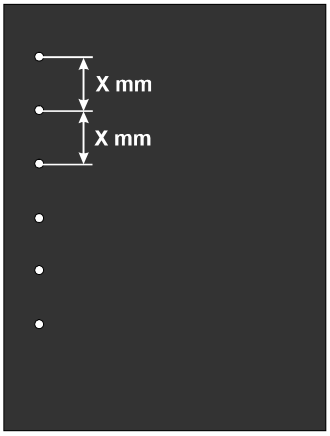
Possible Cause (Printer)

- The drum surface is damaged (this is likely if the dots appear at 75.4 mm intervals).

Action:

- Replace the cartridge.

7.1.10 WHITE SPOTS IN BLACK IMAGE AREAS



H547T511.WMF

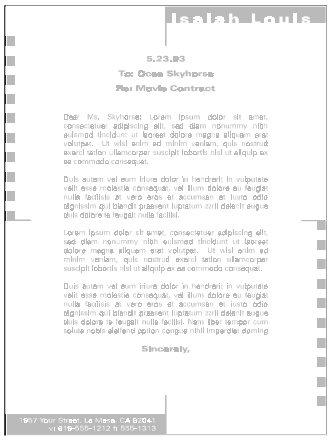
Possible Cause (Printer)

- The drum surface is damaged (this is likely if the dots appear at 75.4 mm intervals).
- The development roller surface is damaged (this is likely if the dots appear at 36.7 mm intervals).
- The toner application roller surface is damaged (this is likely if the dots appear at about 28.5 mm intervals).

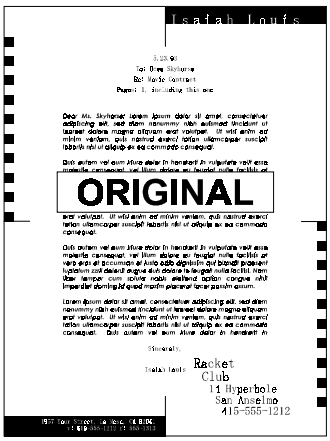
Action:

- Replace the cartridge.

7.1.11 FAINT COPIES



H547T504.WMF



H547T512.WMF

Possible Causes (Scanner)

- Dirty shading plate and/or exposure glass
- Incorrect scan threshold
- Contact image sensor (LED, sensor element) defect

Action:

- Clean the white roller in the ADF.
- Adjust the scan threshold settings.
- Replace the image sensor.

Possible Causes (Printer)

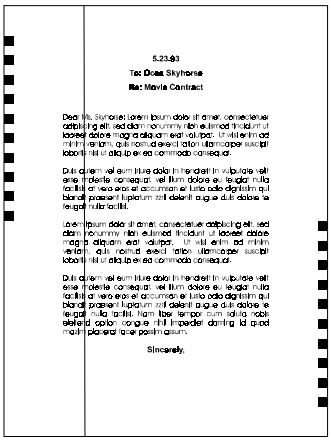
- Poor drum sensitivity.
- Dirty laser optic components.
- Incorrect development/ transfer bias
- Low toner
- Low fusing temperature

Trouble-shooting

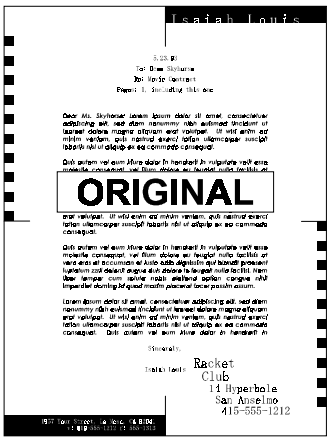
Action:

1. Print a test pattern, and open the cover in the middle of printing.
2. Check to see if the toner on the paper at the entrance of the fusing unit appears faint.
   - If it does, check or replace the fusing lamp, thermistor, and PSU.
   - If it does not, go to step 3.
3. Check to see if the toner on the drum looks faint.
   - If it does, go to step 4.
   - If it does not, check the contacts between the transfer bias terminals and power pack.
4. Check all the contacts between the development and toner application rollers' bias terminals.
   - If it does not, try replacing the cartridge.

7.1.12 VERTICAL BLACK BAND



H547T505.WMF



H547T512.WMF

Possible Cause (Printer)

- A deformed, damaged, or incorrectly positioned toner metering blade.

Action:

- Replace the cartridge.

7.1.13 UNFUSED COPIES

Possible Cause (Printer)

- The thermistor is defective.
- The spring mechanism for the fusing pressure roller is defective.
- Incorrect toner type.
- Non-recommended paper type.

Action:

1. Check to see if the correct type of paper and toner are in use.
   - If it is, go to step 2.
   - If not, use recommended types of paper and toner.
2. Try replacing the fusing lamp and the hot and/or pressure roller.

7.1.14 GHOST IMAGE

Possible Cause (Printer)

- Poor drum sensitivity.
- The cleaning blade is deformed or incorrectly positioned.
- Dirty hot roller

Action:

- Replace the cartridge.
- Clean the hot roller surface and/or replace the cleaning pad.

7.1.15 TONER ON THE BACK OF THE PRINTER PAPER

Possible Cause (Printer)

- Dirty transfer roller
- Dirty fusing pressure roller

Action:

1. Check to see if the transfer roller is dirty with toner.
   - If it is, clean the roller surface by copying a sheet of white paper three times or more. (For better results, copy one sheet at a time)
   - If not, go to step 2.
2. Check to see if the fusing pressure roller is dirty with toner.
   - If it is, clean the fusing pressure roller.
   - If not, check for any other dirty rollers and clean them.

7.1.16 INCORRECTLY ALIGNED OUTPUT

Possible Cause (Scanner)

- Incorrect setting of the document guide.

Action:

- Align each side of the document with the document guides.

Possible Cause (Printer)

- Laser optics are aligned incorrectly.
- Improper print margin setting (main scan direction).

Action:

- Adjust the main scan print margin. (Refer to Section 6-12.)
- Check that the laser optics are aligned correctly.

7.1.17 INCORRECTLY ALIGNED OUTPUT/REDUCED IMAGE

Possible Cause:

- Improper print margin (sub-scan direction).
- Dirty registration roller.

Action:

- Adjust the sub-scan print margin. (Refer to Section 6-12.)
- Clean the registration roller.

7.2 MECHANICAL PROBLEMS

7.2.1 ADF/SCANNER

1. Non Feed

Possible Cause:

- Use of the incorrect document type or size.
- The operation panel is not closed properly.
- The pick-up rollers and feed belt are dirty or worn out.
- The mechanical clutch mechanism for document pick-up is defective.
- Incorrect positioning of the separation roller.
- The scanner motor is defective.

Action:

1. Check whether a correct document type is being used.
2. Check that the operation panel is closed securely.
3. If the problem remains, do the following:
   - Clean the pick-up rollers and feed belt with a soft cloth and water, and replace them if damaged.
   - Check the connection between the FCU (CN14) and the scanner motor.
   - Replace the scanner motor.

2. Jam

Possible Cause:

- Incorrect document type or size.
- The document is too long.
- The scanner rollers (pick-up, feed, R1, and R2 rollers) are dirty.
- Obstruction in the document paper path.
- The scan line sensor is defective.
- Defective scanner motor

Action:

1. Check whether a correct document type is being used, and that the document length is within the maximum limit.
2. Check for obstructions in the paper path.
3. If the problem remains, do the following.
   - Clean the rollers with a soft cloth and water, and replace them if damaged.
   - Check that the scan line sensor is working correctly.
   - Replace the scanner motor.

3. Skew

Possible Cause:

- Incorrect document type or size.
- The document guide is set incorrectly.
- The operation panel is not closed properly.
- The scanner rollers (pick-up, feed, R1, and R2 rollers) are dirty.
- Obstruction in the document paper path.
- The separation roller is out of position.

Action:

1. Check whether a correct document type is being used.
2. Check that the operation panel is closed securely and that the document guide is set properly.
3. Check for obstructions in the paper path.
4. If the problem remains, do the following.
   - Check that the separation roller is set properly. Replace it if damaged.
   - Clean the rollers with a soft cloth and water, and replace them if damaged.

4. Multi-feed

Action:

- Clean or replace the separation roller.

7.2.2 PRINTER

1. Non-feed

Possible Cause:

- Use of a non-recommended paper type.
- The paper cassette end fence is set incorrectly.
- The paper lift mechanism is not working properly.
- Malfunction in the paper feed clutch.
- The paper feed roller is set incorrectly.
- The paper feed motor is defective.
- The registration sensor and/or paper edge sensor is defective.

Action:

1. Check whether a correct paper type is being used.
2. Check that the paper cassette end fence is set correctly and check the paper lift mechanism.
3. Check that the feed clutch for the cassette is working properly.
4. Check that the paper feed roller is installed properly. Clean or replace if necessary.
5. Check the registration roller and its mechanism. Clean or replace if necessary.
6. Check that the registration sensor and paper edge sensor are working correctly.
7. If the problem remains, do the following:
   - Check the connections between the FCU (CN16) and the paper feed motor.
   - Replace the paper feed motor.

2. Paper Jam - Inside Printer

Possible Cause:

- Using a non-recommended type of paper.
- The paper end fence and/or the paper guides in the cassette are set incorrectly.
- The registration roller is dirty.
- The registration sensor and/or paper edge sensor is defective.
- Obstruction in the paper path.
- The main motor is defective.

Action:

1. Check whether a correct paper type is being used, and whether the paper end fence and guides are set correctly.
2. Check for obstructions in the paper path.
3. Check the registration roller and its mechanism. Clean or replace if necessary.
4. Check that the registration sensor and paper edge sensor are working properly.
5. If the problem remains, do the following:
   - Check the connections between the FCU (CN15) and the main motor.
   - Replace the main motor.
   - Check the FCU output of power (CN15-2, 5) and drive (CN15-1, 3, 4, 6) signals to the main motor. If signals are not output, replace the FCU.
   - Check the fusing unit drive mechanism. Check to see that the gears are installed correctly.

3. Jam - Fusing Exit

Possible Cause:

- Use of a non-recommended type of paper.
- Obstruction in the paper path.
- The registration sensor is defective.
- Malfunction in the fusing drive mechanism.
- The paper feed-out sensor is defective.
- Malfunction in the hot roller stripper(s) mechanism.
- Malfunction in the pressure mechanism in the fusing unit.

Action:

1. Check whether a correct type of paper is being used.
2. Check for obstructions in the paper path.
3. Check that the registration sensor is working correctly.
4. Check all the gears in the fusing drive mechanism.
5. Check that the fusing exit sensor is working correctly.
6. Check the hot roller strippers and the pressure mechanism in the fusing unit.

4. Skew

Possible Cause:

- Use of a non-recommended type of paper.
- Incorrect positioning of the paper guides in the paper cassette.
- The separation pad is out of position.
- The paper feed roller is worn out or damaged.
- Obstruction in the paper path.
- Malfunction in the registration mechanism.

Action:

1. Check whether a correct type of paper is being used.
2. Check that the paper guides and the end fence are set correctly.
3. Check that the separation pad is set correctly.
4. Check if the paper feed roller is installed correctly and clean. Replace if necessary.
5. Check for obstructions in the paper path.
6. Check the registration mechanism and clean or replace the rollers if necessary.

5. Multi-feed

Possible Cause:

- Use of a non-recommended type of paper.
- Incorrect positioning of the paper guides and/or end fence in the paper cassette.
- The separation pad is out of position.

Action:

1. Check whether a correct type of paper is being used.
2. Check that the paper guides and the end fence are set correctly.
3. Check that the separation pad is set correctly.

SERVICE CALL CONDITIONS

If the Call Service indicator is lit, one of the following conditions has occurred:

Symptom	Error Code	Sub-code	SC-code
Laser diode failure	9-20	21	2-21
Fusing unit failure (fusing lamp at high temperature during printing)	9-22	01	0-01
Fusing unit failure (fusing lamp not at printing temperature after warm-up)	9-22	02	0-02
Fusing unit failure (fusing lamp at high temperature in power saver mode)	9-22	03	0-03
Fusing unit failure (fusing lamp at high temperature in power saver mode)	9-22	04	0-04
Fusing unit failure (fusing lamp at low temperature in power saver mode)	9-22	05	0-05
Fusing unit failure (fusing lamp at low temperature during printing)	9-22	07	0-07
Fusing unit failure (fusing lamp at an extremely high temperature)	9-22	08	0-08
Fusing unit failure (thermistor error)	9-22	09	0-09
Fusing unit failure (fusing lamp at high temperature in energy saver mode)	9-22	0A	0-0A
The machine detects that both jumper 63 and jumper 64 on the FCU are shorted.	9-22	0B	0-0B
Hexagonal mirror motor startup error	9-23	31	3-31
Hexagonal mirror motor error while printing	9-23	32	3-32
Power pack failure (development roller bias too high)	9-29	51	5-51
Power pack failure (charge brush roller bias too high)	9-29	52	5-52
Power pack failure (transfer roller bias too high)	9-29	53	5-53
Power pack failure (development roller too low)	9-29	54	5-54
Power pack failure (charge brush roller bias too low)	9-29	55	5-55
Power pack failure (transfer roller bias too low)	9-29	56	5-56
Power pack failure (incorrect bias for development and toner application rollers)	9-29	57	5-57
Power pack failure (incorrect bias for development and toner application rollers)	9-29	58	5-58
Power pack failure (incorrect bias for transfer roller)	9-29	59	5-59

To find out which problem has occurred, either:

- See the Auto Service Call report sent to the service station by the machine. This report lists a sub-code, as well as the error message; this sub-code may help you find the problem.
  Alternatively, check the sub-code stored at RAM address 8004B1(H).
- Check the error code history using service function 03.
- Try to clear the service call condition (for failures which are not related to the fusing unit): switch the power off, wait 10 seconds, then switch it back on (for fusing unit errors, set printer switch 01 bit 0 to 1 before switching the machine off)
- The LCD panel displays an SC code when the error occurs.

After each troubleshooting attempt, reset the machine and try to operate it. If the machine still does not work, continue troubleshooting.

7.3 ERROR CODES

If an error code occurs, re-send the fax or have the end user send a fax back to you as the problem dictates. If the same problem occurs, try to fix the problem as suggested below. Note that error codes 4-00, 01, 02, and 10 only appear in the error code display and the service report.

Code	Meaning	Suggested Cause/Action
0-00	DIS/NSF not detected within 40 seconds of pressing Start	Check the line connection. Check the NCU - FCU connectors. The machine at the other end may be incompatible. Replace the NCU or FCU. Check for DIS/NSF with an oscilloscope. If the RX signal is weak, it may be a bad line.
0-01	DCN received unexpectedly	The other party is out of paper or has a jammed printer. The other party pressed Stop during communication.
0-03	Incompatible modem at the other end	The other terminal is incompatible.
0-04	CFR or FTT not received after modem training	Check the line connection. Check the NCU - FCU connectors. Try changing the TX level and/or cable equalizer settings. Replace the FCU or NCU. The other terminal may be faulty; try sending to another machine. If the RX signal is weak or defective, there may be a bad line. **Cross-reference** TX level - NCU Parameter 01 (PSTN), RAM 807FB7 (PABX) Cable equalizer - G3 Switch 07 (PSTN), G3 Switch 08 (PABX) Dedicated TX parameters - Section 4-4
0-05	Unsuccessful after modem training at 2400 bps	Check the line connection. Check the NCU - FCU connectors. Try adjusting the TX level and/or cable equalizer. Replace the FCU or NCU. Check for line problems. **Cross-reference** See error code 0-04.

Code	Meaning	Suggested Cause/Action
0-06	The other terminal did not reply to DCS	Check the line connection. Check the FCU - NCU connectors. Try adjusting the TX level and/or cable equalizer settings. Replace the NCU or FCU. The other end may be defective or incompatible; try sending to another machine. Check for line problems. **Cross-reference** See error code 0-04.
0-07	No post-message response from the other end after a page was sent	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. The other end may have jammed or run out of paper. The other end user may have disconnected the call. Check for a bad line. The other end may be defective; try sending to another machine.
0-08	The other end sent an RTN or PIN after receiving a page, because there were too many errors	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. The other end may have jammed, or run out of paper or memory space. Try adjusting the TX level and/or cable equalizer settings. The other end may have a defective modem/NCU/FCU; try sending to another machine. Check for line problems and noise. **Cross-reference** TX level - NCU Parameter 01 (PSTN), RAM 807FB7 (PABX) Cable equalizer - G3 Switch 07 (PSTN), G3 Switch 08 (PABX) Dedicated TX parameters - Section 4-4
0-14	Non-standard post-message response code received	Check the FCU - NCU connectors. Incompatible or defective remote terminal: try sending to another machine. Noisy line: re-send. Try adjusting the TX level and/or cable equalizer settings. Replace the NCU or FCU. **Cross-reference:** See error code 0-08.
0-15	The other terminal is not capable of a certain function	The other terminal does not have the SEP or SUB function.
0-17	Pressing the Stop key interrupts communication.	If the Stop key was not pressed and this error keeps occurring, replace the operation panel or OPU.

Code	Meaning	Suggested Cause/Action
0-20	Facsimile data not received within 6 seconds of retraining	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. Check for line problems. Try calling another fax machine. Try adjusting the reconstruction time for the first line and/or RX cable equalizer setting. **Cross-reference** Reconstruction time - G3 Switch 0A, bit 6 RX cable equalizer - G3 Switch 07 (PSTN), G3 Switch 08 (PABX)
0-21	EOL signal (end-of-line) from the other end not received within 5 seconds of the previous EOL signal	Check the connections between the FCU, NCU, & line. Check for line noise or other line problems. Replace the NCU or FCU. The remote machine may be defective or may have disconnected. **Cross-reference** Maximum interval between EOLs and ECM frames - G3 Bit Switch 0A, bit 4
0-22	The signal from the other end was interrupted for more than the acceptable modem carrier drop time (default: 0.2 seconds)	Check the line connection. Check the FCU - NCU connectors. Replace the NCU or FCU. Defective remote terminal. Check for line noise or other line problems. Try adjusting the acceptable modem carrier drop time. **Cross-reference** Acceptable modem carrier drop time - G3 Switch 0A, bits 0 and 1
0-23	Too many errors during reception	Check the line connection. Check the FCU - NCU connectors. Replace the NCU, FCU. Defective remote terminal. Check for line noise or other line problems. Try asking the other end to adjust their TX level. Try adjusting the RX cable equalizer setting and/or RX error criteria. **Cross-reference** RX cable equalizer - G3 Switch 07 (PSTN), G3 Switch 08 (PABX) RX error criteria - Communication Switch 02, bits 0 and 1
0-24	Printer failure occurred while the memory was full during non-ECM reception; negative response returned	There is no memory space available, or substitute reception is disabled. Try asking the user to add optional extra memory.
0-29	Data block format failure in ECM reception	Check for line noise or other line problems. Try receiving from another machine. Replace the FCU.

Code	Meaning	Suggested Cause/Action
0-30	The other terminal did not reply to NSS(A) in AI short protocol mode	Check the line connection. Check the FCU - NCU connectors. Try adjusting the TX level and/or cable equalizer settings. The other terminal may not be compatible. **Cross-reference** Dedicated TX parameters - Section 4-4
0-52	Polarity changed during communication	Check the line connection. Retry the communication.
0-70	Communication mode specified CM/JM and it was not available. (V.8 calling and called terminal)	The other terminal did not have a compatible communication mode (e.g., the other terminal was a V.34 data modem.) A polling TX file was not ready at the other terminal when the calling terminal initiated polling RX.
0-74	The calling terminal fell back to T.30 mode, because it could not detect ANSam after sending CI.	The calling terminal could not detect ANSam due to noise, etc. ANSam was too short to detect. Check the line connection and condition. Try receiving a call from another V.8/V.34 fax.
0-75	Calling terminal fell back to T.30 mode, because it could not detect CM in response to ANSam. (ANSam time out)	The terminal could not detect ANSam. Check the line connection and condition. Try receiving a call from another V.8/V.34 fax.
0-76	The calling terminal fell back to T.30 mode, because it could not detect JM in response to CM. (CM time out)	The called terminal could not detect JM due to noise, etc. Check the line connection and condition. Try making a call to another V.8/V.34 fax.
0-77	The calling terminal fell back to T.30 mode, because it could not detect CJ in response to JM. (JM time out)	The calling terminal could not detect JM due to noise, etc. A network that has narrow bandwidth cannot pass JM to the other end. Check the line connection and condition. Try receiving a call from another V.8/V.34 fax.
0-79	Called terminal detected CI while waiting for a V.21 signal.	Check for line noise or other line problems. If this error occurs, the called terminal falls back to T.30 mode.

Code	Meaning	Suggested Cause/Action
0-80	The time out in V.34 phase 2 (line probing) disconnected the line.	The guard timer expired while starting these phases. Serious noise, narrow bandwidth, or low signal level can cause these errors. If these errors happen at the transmitting terminal: Try making a call later. Try using V.17 or a slower modem with dedicated TX parameters. Try increasing the TX revel. Try adjusting the cable equalizer setting. If these errors happen at the receiving terminal: Try adjusting the cable equalizer setting. Try increasing the TX level. Try using V.17 or a slower modem if the same error is frequent when receiving from multiple senders.
0-81	Line was disconnected due to time out in V.34 phase 3 (equalizer training).	
0-82	The time out in V.34 phase 4 (control channel start-up) disconnected the line.	
0-83	The time out in the V.34 control channel restart sequence disconnected the line.	
0-84	Abnormal signaling in V.34 phase 4 (control channel start-up) disconnected the line.	The signal did not stop within 10 seconds. Turn off the machine, then turn it back on. If the same error is frequent, replace the FCU.
0-85	Abnormal signaling in V.34 control channel restart disconnected the line.	The signal did not stop within 10 seconds. Turn off the machine, then turn it back on. If the same error is frequent, replace the FCU.
0-86	The line was disconnected because the other terminal requested a data rate using MPh that was not available in the currently selected symbol rate.	The other terminal was incompatible. Ask the other party to contact the manufacturer.
0-87	The control channel started after an unsuccessful primary channel.	The receiving terminal restarted the control channel because data reception in the primary channel was not successful. This does not result in an error communication.
0-88	The line was disconnected because PPR was transmitted/received 9 (this is the default) times within the same ECM frame.	Try using a lower data rate at the start. Try adjusting the cable equalizer setting.
1-00	Document jam	Incorrectly inserted document or unsuitable document type. Check the ADF drive components and sensors. **Cross-reference** ADF mechanical problems - Section 7-2-1
1-01	Document length exceeded the maximum	Try changing the maximum acceptable document length. Divide the document into smaller pieces. Check the ADF drive components and sensors. **Cross-reference** Max. document length - Scanner switch 00, bits 2 and 3 ADF mechanical problems - Section 7-2-1

Code	Meaning	Suggested Cause/Action
1-10	Paper at the scan line when the power was turned on.	Remove the document. Check the scan line sensor. **Cross-reference** ADF mechanical problems - Section 7-2-1
1-17	Document jam in the feed-out area	Clear any debris from the sensor actuator. Check the ADF drive components and sensors. **Cross-reference** ADF mechanical problems - Section 7-2-1
1-20	Paper did not reach the fusing exit at the end of printing	Remove the paper. Check the printer drive components and sensors. **Cross-reference** Printer mechanical problems - Section 7-2-2
1-21	Paper present at the fusing exit after printing	Remove the paper. Check the printer drive components and sensors. **Cross-reference** Printer mechanical problems - Section 7-2-2
1-30	Paper ran out during printing	Add paper in the cassette.
1-34	Paper ran out after printing	Add paper in the cassette.
1-71	The cover was opened or the cassette was pulled out during printing	Close the cover or put back the cassette.
2-10	The modem cannot enter TX mode	Replace the FCU.
2-11	Only one V.21 connection flag was received	Change the FCU.
2-12	Modem clock irregularity	Replace the FCU.
2-13	Modem initialization error	Turn off the machine, then turn it back on.
2-20	Abnormal coding/decoding (CPU not ready)	Replace the FCU.
2-23	JBIG compression/ reconstruction error	Turn off the machine, then turn it back on. Replace the FCU if the error occurs frequently.
2-24	JBIG ASIC error	
2-25	JBIG data reconstruction error (BIH) error	JBIG data error. Check the remoter terminal's JBIG function. Replace the FCU if the error occurs frequently.
2-26	JBIG data reconstruction error (Float marker error)	
2-27	JBIG data reconstruction error (End marker error)	
2-28	JBIG data reconstruction error (Timeout)	
2-50	The machine reset itself	Replace the FCU.
3-00	G4 board reset	Replace the G4 board or FCU.
3-10	Disconnection during ISDN G3 communication	Check the other terminal and the ISDN line. The other terminal may dialed a wrong number.
3-11	Disconnection during ISDN G4 communication	Check the other terminal and the ISDN line.

Code	Meaning	Suggested Cause/Action
3-20	A SAC signal was received during ISDN G4 communication	The operator at the other terminal may have interrupted the communication.
3-21	A CSA was sent during ISDN G4 communication, because the Stop key was pressed	The local operator has interrupted the communication.
3-30	Mismatched specifications (rx capability)	Check the receive capabilities requested from the other terminal.
4-01	Line current was cut	Check the line connection. Check the connection between FCU and NCU. Replace the FCU or the NCU.
4-02	The other end cut the received page as it was longer than the maximum limit.	Split the page into smaller pieces, or ask the other end to change their maximum receive length setting, then resend.
4-10	Communication failed because of Tel. No./CSI mismatch (Protection against Wrong Connections)	Reprogram the CSIs correctly, then re-send. The machine at the other end may be defective.
5-00	Data reconstruction not possible	Replace the FCU.
5-10	DCR timer expired	Replace the FCU.
5-20	Storage impossible because of a lack of memory	Temporary memory shortage. Replace the FCU or optional IC card.
5-21	Memory overflow	
5-22	Mode table overflow after the second page of a scanned document	Wait for the messages that are currently in the memory to be sent, or delete some files from memory.
5-23	Print data error when printing a substitute RX or confidential RX message	Ask the other end to re-send the message. Replace the FCU or IC memory card.
5-24	Memory overflow after the second page of a scanned document	Try using a lower resolution setting. Wait for the messages that are currently in the memory to be sent, or delete some files from memory.
5-25	SAF file access error	Replace the FCU or IC memory card.
5-30	Mode table for the first page to be printed was not effective	Replace the FCU or IC memory card.
6-00	G3 ECM – T1 time out during reception of facsimile data	Try adjusting the RX cable equalizer. Replace the FCU or NCU.
6-01	G3 ECM - no V.21 signal was received	
6-02	G3 ECM - EOR was received	

Code	Meaning	Suggested Cause/Action
6-03	G3 ECM - non-standard V.21 code received	The other terminal may be defective.
6-04	G3 ECM - RTC not detected	Check the line connection. Check connections from the NCU to the FCU. Check for a bad line or defective remote terminal. Replace the FCU or NCU.
6-05	G3 ECM - facsimile data frame not received within 18 seconds of CFR, but there was no line fail	Check the line connection. Check connections from the NCU to the FCU. Check for a bad line or defective remote terminal. Replace the FCU or NCU. Try adjusting the RX cable equalizer **Cross-reference** RX cable equalizer - G3 Switch 07 (PSTN), G3 Switch 08 (PABX)
6-06	G3 ECM - coding/decoding error	Defective FCU. The other terminal may be defective.
6-08	G3 ECM - PIP/PIN received in reply to PPS.NULL	The other end pressed Stop during communication. The other terminal may be defective.
6-09	G3 ECM - ERR received	Check for a noisy line. Adjust the TX levels of the communicating machines. See code 6-05.
6-10	G3 ECM - error frames still received at the other end after all communication attempts at 2400 bps	Check for line noise. Adjust the TX level (use NCU parameter 01 or the dedicated TX parameter for that address). Check the line connection. Defective remote terminal.
6-11	G3 ECM - printing impossible because of a missing first line in the MMR coding	Check for problems in the printer mechanism.
6-21	V.21 flag detected during high speed modem communication	The other terminal may be defective or incompatible.
6-99	V.21 signal not stopped within 6 seconds	Replace the FCU.
9-07	Paper jam at the cassette entrance	If the problem persists, replace the FCU. **Cross-reference** Paper non-feed - Section 7-2-2 Jam at the cassette entrance – Section 7-2-2
9-08	Paper jam inside the development area	If the problem persists, replace the FCU. **Cross-reference** Paper jam - Section 7-2-2
9-09	Paper jam in the fusing exit area	If the problem persists, replace the FCU. **Cross-reference** Paper jam - Section 7-2-2
9-10	Toner end detected	Replace the cartridge.

Code	Meaning	Suggested Cause/Action
9-12	Cover open detected during printing	Close the cover, or check the cover sensors.
9-20	Laser diode failure	If the problem persists, replace the FCU or LDDR.
9-22	Fusing lamp failure	If the problem persists, replace the FCU, fusing lamp, thermistor, or PSU.
9-23	Hexagonal mirror motor failure	If the problem persists, replace the FCU or polygonal mirror motor.
9-29	Power pack failure	If the problem persists, replace the power pack or PSU.
9-50	Optional cassette - paper non-feed	Check the paper feed mechanism and sensors. **Cross-reference** Printer mechanical problems – Section 7-2-2
9-51	Optional cassette - paper jam at the cassette entrance	Check the paper feed mechanism and sensors. **Cross-reference** Printer mechanical problems – Section 7-2-2
9-60	Printer error occurs during reception	If substitute reception is switched off and a paper jam or other printer error occurs, the machine will terminate the reception. Check the printer mechanism.
9-61	Memory overflow occurs during reception	Check the SAF.
9-82	Optional multi-purpose feeder - paper non-feed or jam at the cassette entrance	Check the paper feed mechanism and sensors. **Cross-reference** Printer mechanical problems – Section 7-2-2
9-83	Optional multi-purpose feeder - paper length exceeds the maximum limit (600 mm)	Check the paper feed mechanism and sensors. **Cross-reference** Printer mechanical problems – Section 7-2-2
9-84	Standard cassette – paper non-feed	Check the paper feed mechanism and sensors. **Cross-reference** Paper jam - Section 7-2-2

7.4 ELECTRICAL COMPONENT DEFECTS

7.4.1 DEFECTIVE SENSOR TABLE

Sensor	Status	Symptoms if Defective
Document sensor	ON	The LCD displays "CLEAR ORIGINAL" or "DIAL FAX NO" at power-up.
	OFF	The LCD still displays "SET DOC. OR DIAL NO." after a document is placed in the feeder.
Scan line sensor	ON	The LCD displays "CLEAR ORIGINAL" at power-up.
	OFF	The LCD displays "CLEAR ORIGINAL" soon after the start of copying.
Interlock switches	ON	There is no alarm on opening the cover, and the LCD does not display "CLOSE COVER".
	OFF	The LCD displays "CLOSE COVER" at power-up.
Registration sensor	ON	The LCD displays "CLEAR COPY" at power-up.
Paper edge sensor	ON	The LCD displays "CLEAR COPY" at power-up.
Fusing exit sensor	ON	The LCD displays "CLEAR COPY" soon after the start of copying.
Toner end sensor	ON	The LCD displays "SET TONER" at power-up.
Paper end sensor - standard cassette	ON	The ADD PAPER indicator lights even if paper is remaining.
Paper end sensor – paper feed unit	ON	The Add Paper indicator on the operation panel of the lower cassette lights even if paper remains.
Paper end sensor – multi-purpose feeder	ON	The Add Paper indicator on the operation panel of the lower cassette lights even if paper remains.
Upper rear cover switch	ON	The LCD displays "CLOSE COVER" at power-up.
Lower rear cover switch	ON	The LCD displays "CLOSE COVER" at power-up.

7.4.2 BLOWN FUSE TABLE

The only service-replaceable fuses are the following.

Fuse	Symptoms if Defective
PSU - F1/ F2/F3	The machine does not receive power (F3 - 220V PSU only)
Thermofuse (Not installed in the US model.)	Fusing power is not supplied.

Point-to-Point Diagram
Model: Schmidt3

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